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no. 1

THE BULLETIN
OF THE
South African Biological
Society

SERIES I.

MAY, 1918.

NO. 1.

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The South African Biological Society

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Note.—The Executive Committee of the Society is composed of those Office Bearers resident in Pretoria.

THE BULLETIN OF
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Roll of Honour.

HARRY JAMES VIPOND.



BY the death of Harry James Vipond, who was killed in action in Flanders, on February 26th, 1917, South Africa has lost a chemist of high scientific standing, and one who might reasonably have been expected to render her long and valuable services.

Vipond was born on the 7th of December, 1885, being the fourth son of John Vipond, of Dryburn Alston, Cumberland, and later of Cowbyres, Blanchland, Northumberland.

He was educated at Cambridge (Pembroke College). At the University he took a First Class in the Natural Sciences Tripos and afterwards took the Agricultural Diploma.

After taking his degree he was engaged on soil analysis at Rothamstead in connection with a soil survey of Surrey, Sussex and Kent.

Vipond was selected for the Department of Agriculture at Pretoria by General Smuts when he visited England in 1909. He was first engaged as Assistant Chemist to the Department of Agriculture in October, 1909. Very shortly after his appointment he was called upon to act as Chief Chemist, and in 1911 was appointed Chemist to the Department.

Soon after the outbreak of war Vipond went to England on leave, the first he had taken since joining the Department, and at once enlisted in the Coldstream Guards. Amongst the officers of his regiment Vipond was looked upon as one of their most trusted and useful men, and was conspicuous both for bravery and ability. Just prior to his death he had volunteered and had asked to be permitted to go on a very dangerous piece of patrol work in company with an officer and a few others of his platoon. In the performance of this he was struck by a machine-gun bullet which pierced his heart and caused instantaneous death.

His death, and the circumstances which lead to it, are characteristic of the man. He hated all fuss and self-advertisement. He, a man with high and valuable scientific qualifications, quietly enlisted as a private. He did not look for a commission or a soft job, but simply wished to be where men were most required. As he lived, so he died: a man of action, of few words but of sterling worth.

Vipond as a chemist was chiefly interested in soils, and his knowledge of local soils was comprehensive. By his staff he was looked upon as a rapid and accurate analyst. In his laboratory at Pretoria he introduced several new methods of analysis and made original modifications in others.

He was greatly interested in the manuring of maize, and it was owing to his experiments, founded on his knowledge of soil types, that the use of basic slag as the basis of manuring for maize was demonstrated to be so effective. In spite of the fact that he worked under great disadvantages as regards laboratory accommodation and lack of facilities for outdoor work, difficulties which were due to the growth of the Department, he made the best of things and never complained.

During the short time that Vipond was in the Division of Chemistry he published several important papers on the chemical problems with which he concerned himself. Amongst these may be mentioned: "A PROBLEM IN SOIL FERTILITY," "AGRICULTURAL LIME," "SOIL SURVEYS," "THE AVAILABILITY OF PHOSPHORIC ACID IN THE SOIL," "MANURIAL EXPERIMENTS ON MAIZE," and "THE COMPOSITION OF CROPS AND FEEDING STUFFS."

Personally, Vipond was very shy, quiet and retiring. In build he was a fine figure of a man. To his colleagues he was always loyal and helpful; with his staff he was extremely popular. His dominating sense of duty penetrated one, and was more than refreshing.

His loss will be severely felt in the Department and outside, for he was a faithful and zealous labourer in a field which has great opportunities and in which men are badly needed. Those of his colleagues who were privileged to know him feel that they will not see his like again.

Vipond was a member of the South African Association of Analytical Chemists, and a Foundation Member of the South African Biological Society (F.B.S.).

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SOIL
Ser. 1
No. 1-2

Nat. Hist.



Introduction.

To the Members of the South African Biological Society :

I WOULD like to introduce this Bulletin of the Society to you with a few explanatory remarks. When, in 1916, we proposed to found a Society, there were some amongst us who foresaw that the prevailing conditions would render it impossible to issue a Journal regularly. It is almost needless to add that they were quite right.

Economic considerations compelled the Editorial Committee to print and publish the Journal in England. Quite apart from any delay occasioned by making arrangements for this, the contributions offered were for long too few to make up the first issue, let alone to prepare the matter for two or three successive issues. Ultimately, the better part of a year ago now, the manuscript for the first Journal was sent to England, but we are not able yet to state when it is likely to reach Members. Nevertheless, Members should realize that once everything is in running order such delays will be greatly reduced, even in war time.

Meanwhile, the Executive Committee has arrived at the decision to issue a series of Bulletins at more or less irregular intervals. Notwithstanding the higher cost of printing such locally, it has been decided to do so in order that there may be no further interminable delay. By means of the Bulletins it is hoped not only to prevent the interest existing in the welfare of the Society from languishing, but also to stimulate Members to a greater activity in its welfare and growth.

This first Bulletin is intended to illustrate the type of contribution that is desired and contains articles which, while strictly biological and based upon original observations, are calculated to appeal to the interest of all Members (both those that do and those that do not regard themselves as strictly "scientific.")

It is a fact that interesting and valuable observations are often made and seldom recorded, because he who makes them has neither the time nor opportunity to write at length. Indeed, he may not think them important enough. Some of these, written in the rough as short notes, would be very acceptable to the Editorial Committee for the Bulletins. A few, for which we are indebted to the Division of Entomology, are included as illustrations.

May I conclude by expressing the hope that the Bulletins will merit a sympathetic reception, and secure the support and material help of all Members.

A. J. T. JANSE, *President.*

Annual Report.

The following brief report upon the affairs of the Society in the first year of its existence is submitted for the information of members.

The Society came into being during October, 1916, and this, together with other considerations, led to the adoption of the period October-September as the Society year. This report, therefore, deals with matters up to the 30th September, 1917.

The Inaugural Meeting was held at the New Museum, Pretoria, during the evening of the 14th December, 1916, and Dr. H. G. Breijer, the elected President, occupied the Chair. The meeting was attended by a large number of resident members, and attention was mainly given to the further consideration of the aims and objects of the Society, and to the formulating of a working constitution. In November there had been held at Pietermaritzburg and Durban meetings of members resident in those centres, at which a number of resolutions were adopted regarding the management of the Society. These were fully reviewed at the Inaugural Meeting and the main principles adopted. Finally, those present formed themselves into a Local Branch of the S.A.B.S., and decided to continue holding monthly meetings in the same manner as did the Transvaal Biological Society.

Here it may be mentioned that at the time of the Inaugural Meeting 101 Foundation Members had been enrolled. The following table shows the composition of the Society.

Locality	Members of both T.B.S. & S.A.O.U.	Members of S.A.O.U.	Members of T.B.S.	Other Members	Total
Transvaal	6	6	19	11	42
Natal	—	2	1	29	32
Cape	—	5	—	8	13
O.F.S.	—	2	—	3	5
Rhodesia	—	—	—	5	5
Basutoland	—	1	—	1	2
S.W. Protectorate	—	2	—	—	2
	6	18	20	57	101

From this it will be seen that membership comprised 44 Members of the amalgamated societies. The selection of office bearers was based upon the support given by the different areas and the different societies, and an analysis shows that the council fairly represented the different interests.

Thus the Transvaal was entitled to 8 representatives and had 7

Natal	6			4
Cape	3			3
Orange Free State ,,	1	„	„	1
Rhodesia „	1	„	„	2
Basutoland „	0	„	„	1
S.W. Protectorate „	0	„	„	0
	<hr/>	19		<hr/> 18

In accordance with the views of the several meetings mentioned, a constitution was drawn up by Members of the Council resident in Pretoria, and this, being approved by the Council as a whole, was brought into operation on the 8th January, 1917.

Unfortunately, during this period of the Society's growth the Hon. Secretary, Mr. C. K. Brain, was called away from Pretoria on official duties and was, for several months, unable to attend to its affairs. Later in the year the Society also suffered through the recurrence of the same unfortunate state of affairs.

Early in February the Editorial Committee began the preparation of the first number of the Journal. After a series of delays incidental to obtaining quotations for printing, enlengthened by the want of sufficient manuscript, the matter was forwarded to England, where it arrived only in August last.

Immediately advice was received that the printing of the first number was in hand, an advice was sent to all Members of the Society under date of the 25th September, 1917, to this effect and asking for contributions towards a second issue. Writing at this late date, April, 1918, there has been a most regrettable want of response.

At the end of September there were 132 Members, distributed as follows:—

Locality	Members of both T.B.S. & S.A.O.U.	Members of S.A.O.U.	Members of T.B.S.	Other Members	Total
Transvaal	6	8	25	19	58
Natal	—	2	2	35	39
Cape	—	8	—	10	18
O.F.S.	—	2	—	3	5
Rhodesia	—	1	—	5	6
Basutoland	—	1	—	1	2
S.W. Protectorate	—	2	—	—	2
England	—	1	—	—	1
U.S. America	—	1	—	—	1
	6	26	27	73	132

The increased membership is not unsatisfactory in view of the fact that the Executive decided not to pursue any active policy in this respect until such time as, by its publications, it could be shown that the Society had come to stay and to fill a useful sphere in South Africa.

It will be noted that the two amalgamating Societies are represented in the new society by 59 Members, or less than half. Unfortunately, a number of Members of the S.A.O.U. and of the Transvaal Biological Society have not yet joined the new Society. It is possible, however, that they may do so later on; a fair proportion are on Active Service.

The Treasurer's account for the period shows a credit balance of £161 11s. 1d., against which the commitments for the first issue of the Journal will probably amount to £60 0s. 0d.

**Treasurer's Account for the Year ending
30th September, 1917.**

REVENUE.

To Subscriptions, 132 @ £1 each	...	...	£132	0	0
Commissions and excess paid by Members	...	...	0	17	9
Transferred Balance of T. B. S. Account	...	...	63	0	9
			£195	18	6

EXPENDITURE.

By Clerical Assistance	...	...	...	£9	4	6
Printing and Stationery	...	...	...	11	16	3
Stamps: Postage and Receipts	...	...	...	5	3	11
Petties	...	...	...	1	0	11
Refunds to Treasurer	...	...	...	1	11	7
Transvaal Branch Expenses	...	...	...	3	9	6
Bank Charges	...	...	...	2	0	9
To Balance	...	...	...	161	11	1
				£195	18	6



Report of the Pretoria Branch (for the Year 1917).

During the year 1917 nine General Meetings of the Transvaal Branch were held. The number of Members living in Pretoria being sixty-one, the average attendance of fifteen per meeting was perhaps rather disappointing.

At the first Meeting on the 18th January, Bye-laws for the Branch were drawn up. Two papers were read, one by Mr. E. M. Robinson on "Blood Smear Diagnosis," and the other by Dr. P. A. v. d. Bijl on "*Formes applanatus* and its effects on the Black Ironwood (*Olea laurifolia*) in South Africa."

At the second Meeting, on the 15th February, Mr. G. A. H. Bedford gave a demonstration on "Some abnormal antennæ of *Gastrophilus equi*," and Mr. Claude Fuller read a paper on "The Wing venation of Termites," which dealt with the ontogeny and phylogenetic significance of this feature.

The third Meeting was held on March 15th, and it was then proposed that the Branch be called the "Pretoria Local Branch," and not the "Transvaal Branch." A paper was read by Dr. H. H. Green on "An Organism which oxidises the arsenite of cattle dip to arsenate," and Mr. Austen Roberts exhibited a new fly-catcher (*Chloropetella suahelica*) from German East Africa.

The fourth Meeting was held on the 19th April. Mr. A. J. T. Janse exhibited a number of moths, collected at Karkloof, Natal, and Mr. Claude Fuller explained the genesis of a termite's nest; exhibiting young colonies he had reared of *Microtermes incertus*, *Odontotermes angustatus*, and *O. badius*.

The fifth Meeting took place on the 5th June. It had been decided in Committee that arrangements should be made for a series of lectures on special subjects at the Branch Meetings. The first subject selected was Mimicry. Mr. A. K. Haagner commenced the series by a paper on "Mimicry in Mammals"; but the series was not continued.

At the sixth Meeting held on the 19th July, Dr. H. H. Green read a paper on "A Bacterium reducing arsenate to arsenite, isolated from a cattle dipping tank."

At the seventh Meeting, 20th September, Dr. H. G. Breijer briefly discussed the "Fever Tree" (*Warburgia Breijeri*), and Mr. A. J. T. Janse described a family of moths not previously recorded from S. Africa.

No papers were read at the eighth Meeting.

At the ninth Meeting, 15th November, Dr. E. C. N. van Hoepen gave an interesting lantern lecture on "Our knowledge of the earliest Tetrapods."

The Officers for the year 1917 were: President, Mr. D. Kehoe; Vice-Presidents, Mr. A. K. Haagner and Dr. E. C. N. van Hoepen; Honorary Secretary, Mr. H. K. Munro.

At the November Meeting the following were duly elected for 1918. President, Dr. E. C. N. van Hoepen; Vice-Presidents, Messrs. A. K. Haagner and G. v. d. W. de Kock; Honorary Secretary, Mr. H. K. Munro.

THE BLACK STORK

(*Ciconia nigra*).

By R. E. SYMONS, Howick, Natal.

The Black Stork is an African bird which migrates from the north to the south, nine months of the year being spent in the latter portion of the continent. Individual cases are known, however, where the birds have remained in the south all the year round. It is one of the rarest, and at the same time one of the most interesting, of the South African migrants. In Natal it is very rarely seen except in the Giants' Castle Game Reserve, which lies along the Drakensberg, between the Giants' Castle and Cathkin Peak. Black Storks arrive on the Reserve about the end of July or the beginning of August. It has never been ascertained with any degree of certainty when they leave the Reserve for the north, but it is probably during the month of April, when winter is close at hand. On returning to the south in July a pair of storks will invariably occupy the same nest that they used during the previous summer.

The eggs are laid in August; they are of a dirty white colour and about the size of those of a duck. The number laid varies from two to four, the latter being more common. As many as six eggs were once found in the same nest but, in this instance, it is possible that two pairs of birds were nesting together.

During the year 1906 the writer discovered a pair of Black Storks nesting in a very secluded spot on the Reserve, and since then a pair returned regularly until 1913 to the same spot. On one occasion, the birds having been disturbed, a new nest was built in the same hollow, but in the following year they returned to the old site. Unless molested there appears to be no reasonable ground for doubting that storks return to the same nest year after year and, on the death of one or both of the birds, the nest is occupied by a fresh pair. This is known to be the case by experience, the writer having had the opportunity of watching one nest for seven seasons.

In August, 1912, four eggs were taken for scientific purposes from the nest in question, and about a month later four more eggs were seen in it. Three of these hatched, and the young were carefully watched. At first they resembled balls of white fluff, and it was not until they were six or seven weeks old that any dark brown feathers made an appearance.

Two of these were ultimately taken for the Zoological Gardens, Durban, where they became exceedingly tame and very soon learnt to take frogs and fish. Unfortunately, one was accidentally killed; a huge toad was given to it by a native, the bird attempted to swallow this but the amphibian stuck fast in its throat. Although the toad was removed, the bird never recovered and died soon afterwards. The other did very well and became a great pet. It developed a curious way of asking for food. When anyone approached, the bird would immediately sink on to the ground fluttering its wings, and at the same time emit a peculiarly sobbing noise, while moving its head up and down continually.

Being anxious to see a stork in the act of feeding its young, I determined to watch the nest in Bamboo Hollow, a secluded spot on the Reserve, where a pair had nested for many years in succession. This is

one of the prettiest spots on the Reserve, it lies at the junction of two streams, and is practically surrounded by krantzes. It is about 100 yards long by 50 yards wide, and in it the Berg bamboo grows. The larger of the two streams, after passing through a narrow gorge, whose sides are from fifty to sixty feet in height, enters the hollow over a fall. At the foot of the fall there is a beautiful pool, and overhanging this a sheer krantz; half way up the krantz a piece of rock juts out and forms a narrow ledge or shelf about four feet square. It is on this that the storks have built their nest; a better site could hardly have been chosen. It is partly protected from the weather by overhanging rocks and, the pool being directly below, it is impossible for any wild cat or other animal to raid the eggs or young. The nest can be reached by the aid of a rope, and it is by this means that the birds for the Durban Zoo were taken.

Early one morning in November, 1912, the writer rode over to the Hollow with the object of watching the nest and seeing the young fed. At the time it contained three nestlings, each about the size of a fowl, with brown feathers just replacing the white fluff. On my arrival, one of the parent birds was noticed standing on the nest, but very soon became alarmed and flew off down the valley. A position was chosen under the krantz opposite the nest at about twenty yards distant; from there it and its contents could be seen without difficulty. Six hours were spent patiently in a cramped position, but without result, as the parent bird had evidently taken alarm, for on my moving out of the hiding place it was seen soaring overhead. A few days later the spot was again visited, this time before sunrise. As a preliminary a screen of branches and bamboo was made under the krantz and, concealed behind this, there seemed very little fear of detection.

After some three hours had elapsed, a slight sound was heard from the direction of the nest; a glance showed that the stork had arrived and was standing on its edge. The young birds became very excited, flapping their wings and craning their long necks, at the same time making a sobbing noise. Their parent then disgorged the food and, depositing this at the bottom of the nest, left her offspring to fight over it, whilst she perched herself on one leg by the edge of the nest, prepared to enjoy the morning sun and keep a sharp look out for danger. Some time was spent watching the bird but, whenever an attempt was made to change my position, its long neck would be at once craned forward and eventually, the stork's suspicions being aroused, she flew off.

Except in colour, the Black Stork is very similar to the common White Stork (*Ciconia ciconia*), the European migrant which is so familiar in almost every part of South Africa during the summer months. The back, neck, head and upper portion of the wings are of a uniform dark brown colour; the breast and under part of the wings are pure white; the legs, feet and beak are light red, and this last colour also prevails round the eyes.

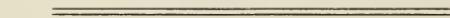
The food of the Black Stork consists chiefly of fish, frogs and grass-hoppers. Unlike the White Stork, it does not walk about in search of food, but will stand perfectly motionless in the middle of a river, or on the banks of small streams, and woe betide the fish or frog which comes within reach of its deadly beak. Before sunrise, one morning in September, 1906, a large bird was seen standing in the middle of the Bushman's River. At that time it was impossible for me to ascertain

even the native name of this bird, and it was not until some years later that I found it to be the Black Stork. Again, in August, 1907, one was seen in practically the same spot. This was shot when on the wing, but only slightly wounded. On being approached, it became very vicious and made a very peculiar clucking noise. Whilst still some distance away from the bird it was seen behaving in a curious manner, afterwards explained, when three trout, each about five inches in length, were found to have been disgorged.

Black Storks are now protected by law, but when first the writer took charge of Giants' Castle Game Reserve they were destroyed owing to their partiality for trout, which had been introduced into the Bushman's River. The storks consume a large number of trout every year, but they probably do more good than harm, as all the streams in the Reserve, with the exception of the Little Tugela, are practically overstocked.

Black Storks are to be found in the Drakensberg, both in Natal and Basutoland, frequenting most of the streams in which fish is plentiful, such as the Bushman's River, in Natal, and the Mokhotlong, a tributary of the Orange, on the Basutoland side of the mountains. Natives do not appear able to give a name to this bird, possibly because the species is rarely seen away from the mountains in Natal.

The eyesight of the Black Stork is wonderfully keen, and anyone wishing to study its habits must persevere be exceptionally patient, otherwise he will learn nothing. The nest is built of sticks and twigs and lined with grass, very much after the nature of an eagle's nest.



A MIERKAT AND A COBRA

By CLAUDE FULLER.

(Written at De Wildt, 2nd October, 1915).

This morning, when driving to the farm with a young friend, our attention was drawn by three reddish mierkats scampering across an open space between two clumps of trees. The road looped itself about these clumps, and as the sharp bend brought us around the outer clump, there sat, some twenty feet away, a fourth mierkat, erect upon its haunches. We were travelling slowly, and within another twenty feet or so we had pulled up because there had arisen, just at the feet of the mierkat, and as if from below ground, that which looked like nothing more than the polished blade of an assegai, all glistening in the sun. The realization that a snake was about to engage the mierkat was instantaneous. In drawing rein we came broadside on the animals at bay, and so close that we were able to watch every action that followed without moving in our seats; so close, indeed, that we could see the stiff little whiskers of the mierkat and the cold glint of the snake's eye.

It is worth mentioning here that a light breeze was blowing directly from us towards the snake and mierkat, but so intent were they upon the matter in hand that neither took notice. The snake reared itself, and

extending its hood, was seen to be a Cobra. Both animals "stood erect," facing each other, the distance between them appearing about twenty inches. The attitude of the snake was one of rigid intense ness: it moved its head not at all. Bolt upright sat the little mierkat, its nose in a line with the head of the snake; but its head was restless, twisting rapidly and unceasingly from side to side. This was no slight turning, as the head was thrown sharply to the right as far as would seem possible, and then, quickly to the left; the action resembling more the swift working of a piece of mechanism than any animal motion. Only occasionally, and then for very short intervals, did the mierkat gaze, head unmoved, at the snake.

Suddenly the mierkat, with jaws extended and whiskers bristling, sprang, as a flash, towards the snake, recoiling instantaneously and dropping on all fours just a little further off, and possibly a little to one side of where it had just before stood. A moment later it was again upright, facing the snake. Its lunge was obviously an attempt to grasp the reptile high up by the throat, and its jaws snapped when close to their objective. But the snake made no attempt to strike. Presently the little animal lunged again, with similar results, and then, as it recoiled, the snake struck. It had chosen a moment when the mierkat was more or less prone; it missed, hitting about an inch too wide, but with great force. One listened for the thud of the impact of its head against the ground as one saw the dust fly upwards. By the time the mierkat had resumed the offensive the snake was back on guard, hood extended, rigid and erect.

Moments flew past. The attitude of the mierkat was one of defiance, of the snake patience and fixed intent. Then the mierkat turned its head far to the right, and kept it there some moments, as if to say: "Strike now, I am not looking"; then it turned it to the left and pretended to look the other way, but the snake would not strike. Then the mierkat made several more feints, and the snake struck again with no more result, as it seemed to me, than to hurt itself; this time missing its opponent by but a hair's breadth.

After this the snake seemed less inclined than ever to strike, and again and again the little mierkat laid itself wantonly open to attack, turning its head casually to one side then to the other, not moving it rapidly from left to right; and, more remarkable still, again and again turning its back entirely to the reptile, switching round rapidly like a mechanical doll upon a pivot. But I noticed that whenever the mierkat had its back to the snake it pivotted its head full to left and right incessantly. From where I was I could not make out, owing to the short grass around the combatants, where the mierkat's tail was when it stood with its back to the snake, all I know is that if extended it must have reached to within a few inches of the snake's belly. Not once, however, did the snake strike at those times when its opponent's back was turned to it.

Never have I regretted not having a snap-shot camera with me more than on this occasion. My companion and I spoke freely to one another as we watched, and because the animals took no notice of us, notwithstanding we were to the windward of them, I at last decided to try and take a photograph with a large camera that I had packed away in the boot: I got out of the cart, got the tripod ready, and then withdrew the

camera from its case. As I did this the snake struck for the fourth and last time during the minutes, perhaps ten, that we had been fascinated spectators. As it rose from its strike, I think the glint of the sun upon the brass fittings of the camera must have caught its eye, for it instantly disappeared. I could not think that it was gone, and stood watching a moment to see it rise again. The mierkat stooped, sniffed the ground here and there, as if looking for the snake, and then ran off to join his companions in the further clump of trees. I seized the whip and ran across the intervening space, expecting to find the snake, but it was not there. In the soft earth, where the combat had taken place, were the spoors of both animals, and I could only conclude that the snake had disappeared into a hole within a few inches of where the encounter had taken place. Here I noticed one particularly long cross-ridged impression where the snake had "stood."

My conclusion was that the mierkat had been disputing with the snake its passage from or to its hole in the ground.

LEAVES FROM AN ENTOMOLOGIST'S JOURNAL

Notes and Observations on the Horned Mantis (*Hemiempusa fronticornis* Stål).

By A. J. T. JANSE.

The Mantis, or "Hottentot's God," is one of the few well-known insects, and attracts attention in one way or another of those who are not lovers of insects, or who look upon them only as pests. At one time it is the beautiful colour of the Mantis that demands notice, at another it is the peculiar markings on wings, on the abdomen or on the legs that strike the observer; often it is the insect's remarkable attitude, as this will always amuse even those who are not otherwise at all interested in the creature.

Surely most readers have seen the almost human expression a Mantis can acquire, especially when it tosses the head upwards or sideways, just as if it were an attentive listener to one's remarks. Many must have noticed the intelligent manner with which it watches its prey, following every movement of its prospective meal, bringing its forelegs ready to strike, and swaying its whole body backwards and forwards ready to spring at the right moment; and how seldom it misses anything it aims at.

I admit that the further part of the proceedings soon replaces any kindly feeling by one of repugnance, and it is only when we call to mind that the victim probably does not have that amount of pain which it appears to suffer and, further, that the Mantis kills only that it may live, that we refrain from any interference. When the farmer or gardener is told of how many insects the Mantis eats, insects that would otherwise have destroyed some choice fruit or vegetable, he learns to look upon it as a benefactor provided by Nature for the benefit of man. I really wonder what the views of the Mantis would be on such a human argument!

Observers who have any artistic temperament will certainly look upon the Horned Mantis as the most beautiful of all its tribe. The head, the thorax, the front legs and the femora of the remaining legs are a vivid green and suggest at once that this insect lives by preference amidst foliage. The tibiae are a speckled brown, and the tip of each femur of the four hinder legs is decorated with a brown leaflike projection, very much resembling a stipule. The rather long feathery antennæ are bright yellow. The notched sides of the abdomen project beyond the folded wings.

Certainly the wings are the most attractive feature of the insect. From the base of each to about four-fifths of its length, the upper wings are of a bright yellow, here the yellow gradually merges into a most delicate pink, which becomes most intense towards the edges. Here and there a series of brown speckles may be seen and, as the edge of each wing possesses a vivid green line, when folded the yellow is bordered on each side by this green, giving the whole a very flowerlike appearance.

If one imagines this insect on a plant, it is easy to explain its peculiar colour scheme, and to arrive at the conclusion that it is well protected by some resemblance to a flower against the attack of bigger insect-eaters. Having formed such an opinion, the casual observer probably drops the subject and directs his attention to something else. The enthusiast, and he of the more philosophic turn of mind, will not, however, be satisfied with this conclusion, because a general green colour scheme would have answered the purpose just as well. It would take some hard thinking to arrive at the true solution of the problem if one has not had the opportunity of observing the creature among its natural surroundings.

That is perhaps the reason that I did not find a satisfactory answer to the question "Why is this insect so beautifully coloured?" until one day I came across it rather unexpectedly. This experience I will now relate, as it may interest some readers and stimulate them to make observations in the field, rather than speculate in the study.

Whilst entomologising on a hill near Pretoria, my attention was drawn to a small shrub by the rather unusual number of Blues (*Lycenids*) flying about it. Certainly ten or twelve were around the bush and in a cluster, not isolated as they are as a rule. This surprised me the more when I noticed that the shrub was not in flower, and that one particular side was favoured by the butterflies more than the other. Approaching slowly to within six feet, in order to watch the *Lycenids* more closely, I looked all over the bush, but could not detect any attracting cause. Suddenly, however, I saw something float to the ground. It was a *Lycenid* wing, and it dropped and came to rest with at least a dozen other *Lycenid* wings.

Coming a little nearer still and looking directly into the bush I saw, between the branches, the petaloid wings of a Horned Mantis. Its head was directed downwards and the abdomen lay somewhat against the support to which it was clinging, so exposing its fine coloured wings among the leaves. At the moment when I espied it, it was making a meal of a *Lycenid*, and as the thorax of its victim was consumed, the wings one by one dropped to the ground. The meal finished, the Mantis cleaned its antennæ, and then sat very still waiting for things to happen. I, too, had not long to wait for, though the Butterflies were scared away a little on my approach, now that I was standing quite still they drew near again to the shrub, circling around it in narrower and narrower

circles ; circles the centre of which was the Mantis! This innocent looking fellow kept motionless except that the head in little jerks moved this way and that, following in every detail the movements the Butterflies, awaiting the moment that one should come near enough to seize it with those cruel-looking front legs, those formidable weapons that can be posed so meekly and prayerful. After about ten minutes of flying round and round one Lycænid came near enough and was caught most dexterously.

No decoy could have worked better. But how did it work ? That the pattern and colouration of the wings have a great deal to do with it is without doubt, but I am not satisfied that this was the only means employed by the Mantis to draw the Lycænids near enough to capture them.

Experiments with other insects, Bees for instance, have shown that the sight of insects is not as well developed as that of higher animals, and I hardly think that a Butterfly could notice the flower-like wings at a greater distance than a few yards. Even to the eye of an entomologist it was not a conspicuous object at that distance on account of its lack of movement.

When I went away from the spot, I carried with me the impression that something had escaped my notice, that some other means was adopted for luring the Lycænids from a distance. Perhaps some special odour is given off and this lures Butterflies on until they notice the mock flower, this mask of deception serving to bring them within reach. However, I am now out of the region of observation and drawing on my imagination. Such speculation may be useful at times, yet it is dangerous and represents ground that should be trodden with care.

THE BIRDS ABOUT OUR HOMESTEAD

By AMBROSE A. LANE, Potchefstroom, Transvaal.

There can be no doubt that the sparrow is the principal pest of civilisation as far as birds are concerned. The European sparrow (*Passer domesticus*) has so long been a prominent feature of great cities, that one can imagine it thronging in the market places of ancient Rome and Athens, or witnessing the feats of the gladiators from the walls of the Coliseum of these or a still more ancient city. Prophesying for the future, one might predict this or another similar species monopolising the air spaces of every great city of the world.

If members of the genus *Passer* would confine themselves to urban surroundings, and to scavenging, we might appreciate them. But the habits they develop out of town, as pilferers of chicken food, as garden pests and as wholesale destroyers of the grain crops of the agriculturist, make them an unmitigated nuisance.

We can hardly imagine the sparrow, as we know it to be, before the rise of man ; but that the species has, with human progress, become a "parasite" seems certain. Go far out into the unpeopled veld where its boisterous, self-assertive chirping has never yet been heard, and devise a homestead, or attempt to make a kitchen garden, and the sparrow will sooner or later appear. Let civilisation spread, and it will spread and

increase accordingly. Grass finches, weaver-birds, and other indigenous finks may have frequented some "fontein," but they will gradually be forced to the background, or obliged to desert their original haunts, by this indomitable intruder.

Our homestead is some miles from the township but, as settlement extended from the latter, the "mossie" as the sparrow (*Passer melanurus*) is called locally, could not fail to be in the van. For the first few years it was sparsely represented. As the privet hedges grew up round our gardens they were monopolised by the scarlet bishop weaver (*Pyromelana orix*), and it seemed to prefer the topmost twigs of some uncut hedges to the sedges of the adjacent vlei, which were being drained out of existence. Its three pretty blue eggs were hatched out in many a neatly woven nest, and nesting operations were conducted until about the end of January or February. In March many of these same nests would be taken possession of by the fiery tined little waxbills, whose four or five pinkish white and tiny eggs would replace the blue ones of the "red birds."

Now the "mossie" dominates the "fink space" about the homestead to such an extent that the "red birds" have been obliged to nest in out-laying mealie patches, or in fringes of young poplar. Where they preferred the mealies, in a late season, their nesting time seems to have been relatively delayed and prolonged later than usual. These birds migrate northwards when nesting is over. I founds flocks about Marico in July.

The "yellow birds," as the children call the equally handsome masked weaver (*Hyphantornis velatus*), is more generally resident, and their beautiful pear-shaped nests were once suspended at the extremities of the branches of wattles and gums which grew up round the homestead. But for the last few years the "mossie" invasion has been pressing them also into the background, and they will apparently soon be confined to the willows which have got up recently in the vlei. Even the pin-tailed widow bird (*Vidua serena*), who, with his numerous wives, was much in evidence during summer, along the fence by the kraal, was hardly to be seen last season, and seems likely to be ousted by the "mossies."

Half-a-dozen years back we did not know the golden bishop bird (*P. taha*) on this settlement, but as cultivation extended it appeared, and each summer re-appears in increasing numbers. The Quelea finks (*Q. sanguinirostris*) usually came in hordes when summer had set in, occupying a patch of half-grown beefwoods (*Casuarina*). Their twittering can hardly be designated a song; but so many have been in evidence during the latter months of recent years that their noise, had it been less metallic, might well have been mistaken for the loud babbling of a mountain brook. Nest building was commenced upon a tremendous scale; some trees contained dozens of tiny cup-like structures to the cubic yard, and some were almost denuded of their "needles" for this nest building; but, the needles not being of sufficient length, a high wind generally brought the nests down wholesale. Whether owing to this, or that these months were merely spent in mating and experimental building, the operation was never completed: and, by the end of the year, the birds all departed to the reed beds along the Mooi River, or some locality further south, where they doubtless brought matters to a more successful issue. During April they would return for a couple of weeks, when the chorus of twittering would be kept up until they migrated north. Last year they were little in evidence, so presumably the increase of "mossies" has intimidated

them, notwithstanding their overwhelming numbers. I observed flocks feeding in the open veld, to the south of Marico district, during August, but we did not see any here in winter.

The white-browed weaver (*Plocepasser mahali*) is common all about this district, being more abundant towards the Vaal. I believe it is resident throughout; but, being a dry land frequenter, it is usually seen about green patches of mimosa trees, and here the rather untidy looking nests—like wisps of hay at the ends of the branches—mark its haunts. However, the loud call-note quickly tells its presence, as well as the white plumage exposed as the bird flies from tree to tree.

The red breast rock-builder (*Fringillaria tahapisa*) is also more often found about the dry kopjes, during summer time, though I have seen it about the timber round the homestead. It does not seem to be here in winter. The black throated seed-eater (*Serinus angolensis*) is a common summer visitor, as is also the pied burbet (*Tricholaema leucomelan*). Of indigenous denizens of the veld, which were mostly in evidence before this settlement was laid out, the rufus lark (*Mirafra rufipilea*), the rufus-naped lark (*M. africana*), and the sabota lark (*M. sabota*), have for the most part retired to the dry lands above the main canal; but the plain backed pippit (*Anthus leucophrys*), and the Cape long claw (*Macronyx capensis*), are still much in evidence about the cultivated lands, where they are joined in summer by the stonechat (*Pratincola troquatus*) which comes to nest here. That most useful little bird, the wagtail (*Motacilla capensis*), is ubiquitous, and a welcome resident to all cultivators of the soil. Amongst smaller birds, which are doubtless of great use as insect destroyers, both the black chested warbler (*Prinia flavicans*), and the brown crested grass warbler (*Cisticola ruficapilla*), are plentiful and resident; the former about the cultivated lands, the latter in the bush on the kopjes.

NOTES ON WHITE ANTS.

ON THE BEHAVIOUR OF TRUE ANTS TOWARDS WHITE ANTS.

By CLAUDE FULLER.

Very rightly ants are regarded as the inveterate enemies of termites, but there are certain termites they prefer not to molest, and it is with an observation on one of such that this note will largely deal. I think that every species of ant has an insatiable appetite for termites and, when the opportunity offers to whet this, whole communities are consumed with a blood lust. Holocausts occur with every nuptial flight of termites that takes place in daylight; possibly similar orgies take place after night-fall, but I have not seen one. But when termites are on the wing during the day it is quite a common thing to see the ground beneath, especially roadways and places free of vegetation, alive with ants all scurrying hither and thither in wild anticipation of the coming to earth of the flying termites. One day in Durban I saw along a roadway a flight of *Termitesscaffraiae*, and for a quarter of a mile or more the ants formed a living screen, through the meshes of which no dealate termite could nor did escape destruction. It is only on these occasions that ants of all kinds and descriptions satisfy the craving for a diet seemingly inborn in them,

and contribute so greatly to that restoration of the balance of nature which the ordinary productiveness of a termite colony threatens each summer to overset. Indeed, it is often most difficult to make a complete observation on the doings of one or a pair of termites as, in 99 cases out of every 100, an ant interferes. One bite of an ant is usually sufficient to cripple a termite most effectively, and ants have surely no more hapless prey.

How attractive termites are to the creatures whose name they have usurped is easily demonstrated by placing some of the inhabitants of a nest upon a bare piece of earth. Ordinarily, only a few minutes may elapse before a swarm of earth-vultures collects and carries off, whole or piecemeal, the sacrifice for which we are responsible.

Except that one or two termites may more or less accidentally seize upon the leg of an ant, and so place it at some inconvenience, the termites will put up no fight nor offer any great show of resistance. The sight is simply a tragedy.

That ants respond readily to such stimulus is well illustrated by a happening coming under my eyes almost a year ago. We have in Pretoria a very common ant, well known on account of its predilection for garnering the large white plumed seed of an all too prevalent weed. None can help but notice all about the town the droves of worker ants as they move their snow-white burdens homewards; none can fail to see piles of empty husks forming ramparts about the many entrances to their subterranean granaries. This species does not enter houses unless it be by accident; in this they are quite different from several other kinds occupying the same territory. However, one day when working by an open window upon a quantity of live termites, to my surprise, almost to my indignation, a column of the same ants advanced over the windowsill and made a raid on my collection. These ants may have been foraging in the garden quite near by, but they had climbed six feet up the wall to effect their entrance.

With certain exceptions, and most of these require further investigation, ants are not particularly effective enemies of termite colonies. It is generally presumed that they wage an incessant warfare underground, tunnelling their way into termites' hives and slaughtering the inhabitants. There is much to give colour to this belief, but the evidence that little is accomplished is much greater. Later a case is recapitulated where the evidence justifies such conclusions, but even here the process is a slow one and not such as one would be led to expect. In the case of the great termite of the Waterberg district (*Termes Waterbergi*) I have occasionally been disappointed in exploring a nest, finding it inhabited by an ant of the "driver" type. There may, therefore, be something in the local legend to the effect that if the large Red Ant (*Dorylus helvolus*) establishes itself within the precincts of a house, that house will not be attacked by termites.

The observations which I have in mind to record were made in Pretoria. Here there exists a strip of grass veld fenced in on either side, which was probably designed for a roadway, but as it starts from nowhere in particular and leads into a donga it is out of the unbeaten track and is still the homeland of several species of termites. Of these, two kinds predominate, one a *Cubitermes*, another a *Eutermes*; the former is related to, if not actually identical with, Haviland's *Termes bilobatus*, and the latter bears the same relation to the insect he described as *Eutermes*

trinervius. These two differ from one another in a number of particulars of which a few, those that are the most striking by contrast, may be mentioned.

The nests are not unlike from the outside, as both take the form of more or less hemispherical mounds; but it is only the smallest mounds of the *Eutermes* that resemble those of the *Cubitermes*. The last mentioned never builds a nest of more than 6 to 10 inches high, nor 12 inches or so in diameter, whilst a *Eutermes* nest may be over two feet in height, and is very often four feet in diameter. Always, the nests of *Eutermes* are more friable than those of *Cubitermes*, and these, so often resembling a stone inset in the soil, are sometimes almost as hard as one. The internal structure of the two is quite different. That of the one (*Cubitermes*) comprises a multitude of small and roughly spherical cells, each having a passageway into one or several of the adjacent cells, a small round hole no bigger than is necessary for the head of the soldier to pass through. The internal arrangement of the other (*Eutermes*) looks to be cellular at first, but a closer inspection shows it to be a series of interlacing passages.

A further marked difference will at once be apparent on inspecting their nests. That of the *Eutermes* is stocked with short lengths of dried grass, while the other is bare of provender. *Eutermes* is a harvester and haymaker in every sense of the words; foraging parties go forth at night and reap the grass, by day-break they have carried it below ground and spread it out in the thousand and one little special drying cells, from whence, when converted into hay, it is carried into the main nest and literally kept against "a rainy day." Except for the inhabitants, the *Cubitermes*' hive is empty; there are no stores of any sort, no evidence of industry. Where they obtain their supplies, where they store it, I can only guess. Haviland states that *Cubitermes bilobatus* feeds on dung. I have on one occasion found them in the moist soil immediately below a cow dropping, and on another raiding the supply of a *Copris* larva deep in the soil; but the insects are far too common for these instances to be regarded as anything but exceptional. I think that, in common with earthworms and certain beetle larvae, they obtain their nourishment by feeding upon the soil—soil that is full of humus—and that they carry in their bodies such food as is needful for the continuous feeding of the royal pair, for the soldiers and for the upbringing of the young.

We may now turn to the different appearance and the different behaviour of these two termites when their respective nests are opened. The nests of *Cubitermes* are inhabited by numerous small creatures with round and milk-white heads and blue greasy bodies, and these lumber casually about; they are the workers. Perhaps, by an extra careful search, or just by accident, we also may notice one of the few soldiers the nest contains, and see it make an endeavour to get out of sight. This soldier is not much bigger than the workers, but its head is yellow, long and barrel shaped, and bears a pair of long and slender mandibles, between which there juts out a curious white fork. Should we wait patiently, and no marauding ants come by, after a little while the workers will be seen sedulously building up where we had broken down.

On the other hand the nests of *Eutermes* seem inhabited by a multitude of curious looking and anxious little creatures, which pour forth from the break in the mound and scatter promiscuously all around. Looked at attentively, they are seen to possess weird pear-shaped heads

with long snouts that are held high and defiantly in the air. Many cluster closely within each orifice, so that no creature may pass the *chevaux de frise* made by their heads, while several thousand others go further afield and bid a bold defiance. These are the soldiers, the nasuti or the nosed ones, the true defenders of hearth and home. They have no eyes, their jaws are the merest rudiments, but they are as fearless as the armed *Cubitermes* soldier is fearsome. However, each nasuti has a very effective missile of offence against the chief enemies of the nest, and in addition a strong acrid aroma—a warning to those it most concerns. This missile of offence is not fired off haphazardly; it is but a sticky filament, two or three millimetres in length, ejected out of the snout, and from the tip of which it is waved to and fro like a small banneret. The absence of workers is usually conspicuous; they are quite as numerous as the soldiers and larger, but, when trouble is afoot, they retire deep into the nest and crowd along the subterranean tunnels radiating out to the feeding grounds. Sometimes they stay in hiding until night intervenes and then repair the citadel, but it often happens that after a while and when all is quiet they will push carefully through the serried ranks of the defenders of the galleries and close the gaping orifices with pellets of clay.

Having fully acquainted ourselves with the appearance and more obvious habits of these two termites we may make a more careful survey of the neglected roadway, and observe how the nests are disposed. Here we will find independent mounds of *Cubitermes* as well as many that are closely associated with mounds of one size or another of *Eutermes*. Again we will find some mounds of *Cubitermes* in part or wholly converted into the nests of a true ant (*Plagiolepis custodiens*).

Eutermes always builds independent mounds and *Cubitermes* can do so equally as well; but, where its nest is associated with a small *Eutermes* mound, *Cubitermes* steadily builds the original artifices out of their home, converting its architectural features from winding passageways into small cells. I cannot state definitely what happens between the two termites. It is unthinkable that the insidious *Cubitermes* destroys the *Eutermes*, and I rather think that the latter take their eviction philosophically and erect a new home elsewhere. Certainly in several cases I have seen new mounds erected within a few inches to a foot or so of the raided premises, and could come to no other conclusion than that these were constructed by the *Eutermes* before they had been completely ousted. When, however, *Cubitermes* establishes a home on the edge of a large *Eutermes* mound, so far as the inhabitants of the latter are concerned, the intruders are welcome to the comparatively small accommodation they require. This process of dislodgement of one termite by another has a very close parallel in the ousting of *Cubitermes* itself by the ant *Plagiolepis*. This ant makes its nest alongside that of *Cubitermes* and, search we ever so well, it is only an odd mound that has not got such an ant's nest somewhere on its periphery. Just as insidiously as this termite intrudes into the home of its relative so does the true ant work against it. Hence we find many *Cubitermes* mounds converted and occupied by ants, some being quite disguised by a litter of pebbles thrown over their surfaces. I think that the ants ultimately succeed in destroying all the *Cubitermes*, but one generally finds a small remnant of the colony in the precincts of the mound. I do not think that the *Cubitermes* colonies migrate to a new home elsewhere. There is a considerable difference between the probability of their being able to do so successfully and the ease with

which *Eutermes* may. Although the queens of both species are active one is more mobile than the other. The *Eutermes* queen is always on the move, the *Cubitermes* is not; and, further, there are many well-trod gangways leading away from a *Eutermes* nest which the queen can traverse readily whereas, so far as I can see, no such facilities characterise the nest of *Cubitermes*.

For these reasons, and others to follow, it has occurred to me that there is something more than mere chance in the frequent association of the nests of these two termites. When a hive of *Cubitermes* is broken open it is only a matter of a few seconds before the ants swarm excitedly around and seize and drag off the helpless workers. Those that are exposed are dealt with first, but as more and more ants arrive they rush into such cells as they can and drag forth the retreating victims. On the other hand, we may select the mound of a *Eutermes*, upon whose warm surface a dozen or so ants are disporting. Break into this mound and at once play ceases and a hasty retreat is made.

To explain these matters I selected such a mound, into the northern slope of which a *Cubitermes* nest was built; a nest about which *Plagiolepis* had established itself and into whose duugeons there were three main shafts.

First a slab was broken off the southern slope of the large mound and, as the nasuti army poured forth, the ants ceased their gambollings and retired. Then the *Cubitermes* section received a similar treatment, and here the ants foregathered, more and more arriving as soon as the first victims were carried into the dungeons. The contrast was indeed most striking. Then I took a broken fragment covered with nasuti and from this shook off a fair sprinkling where the slaughter was greatest. Almost at once it received a decided check although it did not wholly cease. Then I placed about half-a-dozen nasuti close about each of the three openings into the ants' abode. Some of these wandered casually in, brandishing their heads meanwhile. In less than a minute ants ceased coming out and these without evinced a strong dislike for home.

Soon I saw an ant here and there in obvious distress. Each rushed blindly forward with head to one side and pressed close to the ground, staggering and grinding its way anywhere, its abdomen twisted sideways.

This manifestation of distress was much like the behaviour that I once witnessed of a dog suddenly blinded in one eye and smarting with pain rubbed its eye violently on the ground.

So as to see to better advantage what had brought this about, a patch of nasuti was established upon the surface of another ant nest near by, over which the creatures were passing busily. All unsuspecting some would walk into the patch and then the trouble began. It was more than laughable to see an ant hurrying along an old worn route, full of life's concerns as ants usually are, come to a startled halt face to face with a nasuti and then as suddenly turn and bolt. Most escaped injury, but the antennae of many came in contact with a sticky banneret, and at once the ant gave evidence of its vitriolic effect. I did not follow the striken ants as they were soon lost to sight in the grass round about.

Later I endeavoured to repeat this experiment, earlier in the day when the sun was hotter. An exact duplication was not obtained. The ants were more sprightly and accidents were fewer, but it was found that they were only temporarily inconvenienced, and are soon able to free themselves of the sticky secretion of the termite.

NATURAL ENEMIES OF THE ARGENTINE ANT

(*Iridomyrmex humilis*, Mayr).

By C. W. MALLY, M.Sc., F.E.S., F.L.S.

The excessive abundance of the Argentine ant (*Iridomyrmex humilis*, Mayr), in the South-western portion of the Cape Province, Union of South Africa, attracts a good deal of attention during the summer months, and not infrequently the question of controlling it by means of natural enemies is raised. It may be as well, therefore, to give a brief summary of what is known in regard to its natural enemies, and to make suggestions with a view to stimulating observations on the subject in countries where it occurs.

In his studies of this ant in the southern United States, Wilmon Newell came to the conclusion that it was an introduced species, and that the available evidence pointed to Argentina as the place where the species originated, and he, therefore, proposed the popular name "Argentine ant." In regard to natural enemies, Newell found that in the southern United States the "Argentine ant is remarkably free from enemies, and very few of these have been noted during the course of our investigations, while even these few are of little importance. No true parasites of this ant have been observed, and apparently the only enemies are predatory ones." An immature specimen of the cockroach (*Thysocera cincta*, Burm), was observed by Harper Dean to capture and eat workers of this ant, and later Newell observed the same habit in individuals of this species. Newell also records a "jumping spider" (*Attidae*), and various species of the cobweb-weavers (*Theridiidae*) as enemies of the ant. The latter were troublesome in connection with artificial colonies of the ants, kept for the purpose of observation, *Theridium tepidariorum* being the most abundant; but none of these spiders were observed to attack the ants in out-door colonies. Amongst birds, G. A. Runner observed an English sparrow picking up Argentine ant workers. Newell often observed the flicker or hammerhead (*Colaptes auratus*) "industriously digging up shallow ant nests in lawns and grass plots," and he considers it "the most important natural enemy which this ant has in the South."

That the natural enemies above referred to are of little use is shown by the fact, that in the opening paragraph of the report by Newell and Barber (Bulletin 122, Bureau of Entomology, U.S. Department of Agriculture, Washington, D.C., 1913), from which the above quotations are made, the Argentine ant is designated as "the first among the *Formicidae* to attain the front rank among injurious insects in the United States."

Following Newell's conclusion that this ant originated in Argentina, Chas. P. Lounsbury, while Government Entomologist for the Colony of the Cape of Good Hope, made inquiry through correspondents in South America in regard to its natural enemies, but no definite information was obtained.

With one exception, the official entomological records in South Africa contain no reference to natural enemies of the Argentine ant. On one occasion the writer, while examining a nest of this ant in the Botanic Gardens, King William's Town, Cape Province, observed a fly pick up two ant larvae in succession, suck out the juice and void the larval skin. In the ordinary course, the only chance a fly would have of devouring the larvae would be when a nest of ants was accidentally broken open, or turned

out in the process of cultivation. But the worker ants are so quick to secrete the larvæ and pupæ, that the fly would in all probability go away hungry, for it seems very unlikely that it would be able to rob a worker ant in the act of transporting a larva. The writer has not observed any other instances of the Argentine ant being attacked in any stage.

Although practically immune from attack, the Argentine ant in its turn is very aggressive, and successfully attacks quite a list of insects, including injurious as well as beneficial species. In the Cape Peninsula it has maintained its reputation for intolerance towards other species of ants. In areas overrun by the Argentine ant, the writer has not found any other ant, except an occasional colony of *Dorylus helvolus*. On the outskirts of the infected area native species of ants are to be found. If the native species disappear as the Argentina ant increases, and if the latter continues to spread and to thrive in widely separated localities, then South Africa should gradually become a one-ant country! This suggests that, if Argentina is the place of origin, South America should be a one-ant country within the limits of the ant's life zone, unless counterbalancing forces exist.

In a lecture before the Divisional Council of Stellenbosch, in February, 1915, the writer suggested that, in the absence of true parasites or diseases, the fact that on the whole *I. humilis* was not counted a serious pest in its native home, could be explained on the theory that in South America there are counterbalancing species of ants, *i.e.*: species that are as strong numerically and individually, and as sagacious in battle as the Argentine ant. The fact that in the countries where it has only recently become established, it drives out the indigenous ants, whereas in its native country other ants persist, suggests that it has been accustomed to meeting stronger opposition in its original home than the opposition it finds in other countries. Furthermore, the fact that in certain parts of South America *I. humilis* is a more serious pest than in others, could be accounted for by the absence of one or more of the controlling species.

In the writer's opinion, based on observations on this species from the economic standpoint in South Africa for several years, whatever may be the explanation for the difference in the ant's behaviour in South America as compared to that in the countries where it has become established, so far as can be determined, during the last 25 years, the respective Governments of these latter countries should make every effort to determine the facts in the case, with a view to introducing any natural agencies which mature investigations proved to be desirable.

NOTES FROM THE TRANSVAAL MUSEUM

By DR. H. G. BREIJER.

It is with a certain amount of hesitation that I offer the following observations for publication. The reason is obvious. There is a tendency to discredit observations made in such far-off, semi-civilized countries as ours, especially if these observations necessarily entail alterations of long rusty conceptions.

I remember quite well the cynical way in which the observations about the spitting of the *Sepedon hæmachætus* were received by European herpetologists, and the contemptuous air of superiority a well known man assumed when Dr. Jameson told him that we had made the observations ourselves and that a specimen was at his disposal to try the experiment.

Fortunately this gentleman took our advice to cover his face with a pane of glass during the experiment, otherwise he might have lost his eyesight. When the glass was covered with small drops of fluid, ejected by the reptile, the gentleman was more than surprised. He had not only discredited our observations but on top of it never made the slightest excuse for doubting us.

The same attitude is often taken up with regard to systematic work done by the field naturalist. Old systematists, who never leave their room, who never are able to study the live animals in their surroundings, and base all their classifications on skins and skulls or spirit specimens, jump up with contempt if a young man, who has had these opportunities, dares to differ in opinion or dares to undertake some original work himself.

Knowing this attitude, it is reluctantly that I venture to publish an observation made by Mr. G. van Dam, our Junior Assistant in the Department of Lower Vertebrates and Invertebrates (except Insects), and myself.

In 1916 an expedition was undertaken by the Museum to explore the country between the Ngelelle and the Nuanetsi rivers, in the north of Zoutpansberg. On the 25th of July we were on the return journey and, as the collecting had been rather successful, only one bottle of strong spirits was left. We had caught a scorpion, *Opistophthalmus glabifrons*, and a large spider of the genus *Pterinochilus*. Our bottle already contained a few scorpions, which were dead.

The spider had been put in the spirits, but we hesitated to put the scorpion in, because he might do harm to the rare spider. We then took the spider out of the bottle and replaced it temporarily in the collecting tube. The scorpion was then put in the spirits. Everyone, who has handled scorpions, knows that they are extremely tenacious of life, in fact some of them live as long as five hours immersed in spirits of 93%. Our species generally do not die before they have been three or four hours in spirits.

After about half-an-hour, I said to van Dam, "let us see how the scorpion behaves in alcohol when irritated." The bottle was opened and with a stick a slight pressure was exerted on its cephalothorax. Immediately the tail lashed out and the stick was attacked furiously by the sting. The white poison oozed out of the sting. This fluid was visible for quite a long time, and it seemed to coagulate. Then the scorpion inserted its sting between its own cephalothorax and first abdominal segment and seemed to exert considerable pressure. A little white fluid was visible immediately round the sting.

The scorpion then made a few convulsions and, within a minute, ceased to move. Whether it was a deliberate action or whether it was an accident, I do not know; but I think it was deliberate, as previously the stick was hit several times, practically at the same point, about half-an-inch above its point of application, and this point was at least half-an-inch away from the spot where it wounded itself.

Mr. G. van Dam, who has handled hundreds of scorpions, has since then paid attention to their behaviour whilst still alive in spirits. He states that he has never seen a scorpion killing itself in spirits unless disturbed by some external agency, but that, when two or more scorpions are put together in one bottle, fighting starts immediately, with the result that they kill one another or themselves. He made his observations on *Opistophthalmus glabifrons*, *O. pugnax*, *Hadogenes gracilis*, and *H. gunningii*.

I tried several experiments on irritating scorpions by focussing rays of sunlight on different parts of their cephalothorax, but in no single case did the scorpion show any inclination to sting itself.

This observation has a seeming analogy in snakes, as on several occasions I have seen snakes turn and bite themselves when their backs have been broken far back; but whether this has been done with the intention of killing itself or is due to the pain caused by the wound aggravating it into biting something, has not been noted. Several of my assistants have also observed this seemingly suicidal action of snakes when wounded.

OAKS AND THE PUSTULAR OAK SCALE

One of the chief charms of the Cape peninsula, and other parts of the Cape Province below the mountain barrier that separates the comparatively well-watered coastal region from the uplands, is the imposing stateliness of the grand old oaks. Practically without exception the oaks that command one's attention in this region are of one kind, the commonest oak of northern Europe, *Quercus pedunculata*. It seems probable that this oak was the kind introduced by Van Riebeek, growing in boxes, in 1656, and that the present scarcity of other kinds of oaks throughout South Africa may safely be attributed to acorns and young trees of this one kind having from the very early years been obtainable without trouble in the mother districts. In the well-watered districts of the Cape, no other of the very numerous species of *Quercus* might thrive so well and prove of higher ornamental value; but in much of South Africa there is no doubt that one or more other kinds would be better suited by the conditions, and it is everywhere desirable that there be a choice of these magnificent trees for the beautification of our cities and towns.

Unfortunately the common oak has of late years become affected by a disfiguring scale insect, and that fact, together with the more general consideration mentioned, is now directing the interest of the Forest Department and of the Division of Entomology to the collection of information about other kinds. The scale insect is the "pustular oak scale" (*Asterolecanium quercicola*), a European insect which has spread to many far countries. There is no definite information as to how or when it got to South Africa, but it is naturally suspected that it came in with nursery importations of oak trees shortly after the Boer War, at which time efficient Government precautions against such an occurrence were not in force. It came to notice about ten years ago at Johannesburg and in Cape Town suburbs, and it is now exceedingly abundant in these centres and spreading from them. Infested trees are now known at Krugersdorp, twenty miles to one side of Johannesburg and at Irene, as far away on another, while in the Cape the insect is wide-spread in the

peninsula and also is known in Stellenbosch, Somerset West and Elgin. The insect shows as a round, hard scale, about as large as the head of a pin, and generally yellow. Commonly it sits in a slight depression of the bark and suggests a small festering sore. The attack is chiefly on the twigs, many of which die in the summer with the leaves still clinging to them. Few trees succumb to the injuries, but the tufts of dead leaves, which tend to remain through the winter, are a common and pronounced disfigurement. Only oaks are affected, and although various species are recorded to be attacked in Europe, there are grounds for suspecting that *pedunculata*, the common one here, is much the worst sufferer. Therefore, even where this kind thrives the best, it may be advisable to give preference to some other sort in the future. The Government offices alluded to would be pleased to learn of the whereabouts of bearing trees of other kinds in the country and to obtain information in respect of their apparent suitability to the climatic conditions.

The common oak shares the name "English Oak" with a closely related species (*Quercus sessiliflora*), very easily distinguished by its acorn being practically stemless. There is an old reference (1865, Government Botanist's Report) implying that this sessile acorn oak is common in the Cape Province, but no large trees are known to the Forest Department. It is probable that this kind would be a particularly valuable sort for extensive propagation. The acorn is described as larger than the one of the common oak.

The Forest Department states that *Quercus palustris*, *macrocarpa* and *nigra* are at present under trial in the high veld of the Transvaal, and it has knowledge of the Turkey Oak (*cerris*) in a number of localities. These oaks are all like the English Oak in being deciduous. The Turkey Oak seems one of the most promising kinds for South Africa. At "Lourensford," Somerset West, there are a few trees of it that are upwards of six feet in circumference, and on the neighbouring "Oakwoods" estate is a single one, about a foot in diameter, growing in an avenue of common oaks and quite equal to the latter in size and appearance. A single tree stands in the Rondebosch railway station grounds; and, at the end of summer, the foliage of this tree is still fresh in appearance, while that of the common oaks round about is much scorched by the strong south-east wind.

The evergreen oaks are of less interest than the deciduous kinds from an avenue point of view, but some of them are decidedly worth attention in South Africa, and at present little is known about them.

Here and there in the south-western Cape districts is a large cork oak (*Q. suber*), and, since the war increased the cost of getting supplies of cork, some of these trees have commanded attention as bark producers. At the "Lourensford" estate is a small grove of them. The Holly Oak of Europe (*ilex*) is a handsome evergreen and, in the Cape Town Municipal Gardens, there is a large and particularly beautiful tree rightly or wrongly labelled "*Q. ilex integrifolia*." Another handsome evergreen oak, mis-labelled *Q. alba*, grows in the Arboretum at Tokai.

There is danger of introducing serious acorn pests in the importation of acorns, and danger of introducing serious oak tree pests and diseases in importing live oak trees. Therefore, as far as possible, it is desirable that the propagation of oaks be from acorns grown in South Africa. Readers of these notes may be able to tell of sources of supply for various

uncommon kinds within the country. The danger in respect of importing acorns was illustrated by the recent introduction from Japan of about two pounds of acorns of *Q. acuta*. On their arrival fully a quarter of these acorns were found to have been ruined by a boring insect.

NOTES FROM THE DIVISION OF ENTOMOLOGY

PEA WEEVIL (*Bruchus pisi*):—The longevity of the adult beetles is well illustrated by the fact that Mr. C. P. van der Merwe placed some in dry tubes in January, 1916, and these were still alive in the following June.—(C. W. MALLY, Cape Town).

—:o:—

PECULIAR BEHAVIOUR OF ANTS:—On a sunny afternoon about 3 p.m., rain having fallen the previous day, a swarm of ants, males and females, were seen dancing in the sunlight. Capturing a number, it was found that each female held in her jaws a small larva, which she clung to tenaciously. When on the ground and dragging her way through the sand, hampered by the attentions of the males, she still clung to the larva. Even when placed in the killing bottle many females died without letting go their burden. Apparently the young bride takes a baby with her from her old home to start her own establishment; or would it be for provisions?—(C. P. VAN DER MERWE, Durban).

—:o:—

PEACH BLOOM AND BIRDS:—Three cases of an obscure attack upon Peach bloom came under notice last season (1916-17). It was found that in all the damage was accomplished by small birds seeking the nectaries of the flowers. A correspondent was advised to watch for the culprits and writes: “I have closely watched the actions of some sparrows and witnessed them simply picking the flowers off one after the other and dropping them on the ground. . . . I see they simply pinch the flowers without taking a piece out.” In the cases under direct observation pieces were taken out of flowers and the majority were not entirely removed from the trees. The flowers on horizontal stems suffered the most.—(CLAUDE FULLER, Pretoria).

—:o:—

HOUSE FLIES IN SLAUGHTER HOUSE REFUSE:—At a slaughter house at Jacobs, Natal, the water with which the floors are washed down and which contains a considerable amount of blood and other dissolved organic matter, is disposed of by leading it into pits, where the soil consists almost of pure sand. Dipterous larvæ were found swarming in the moist sand along the furrows and pools, also in the residue where the water had evaporated. Adults raised from these larvæ were mostly house-flies.—(C. P. VAN DER MERWE, Durban).

I have observed a similar state of affairs in refuse pits at certain sugar mills in Natal.—(C.F.).

NAMES OF INSECTS:—The introduced Eucalyptus borer, which has spread to no small extent over the Union, has long been recorded as *Phoracantha recurva*, New. As a matter of fact no specimens of *P. recurva* have been obtained from South Africa. The proper name of the insect is *Phoracantha semipunctata* Fabr. Similarly the common lucerne butterfly has generally been referred to as *Colias electra*. Mr. Guy A. K. Marshall points out, however, that "Linnaeus having subsequently altered *electo* to *electra* the older name must be retained for the species. It is therefore *Colias electra* Linn."

—:o:—

INTESTINAL MYIASIS OF MAN:—Major Pratt Johnson, Director of the Clinical Research Laboratories, Johannesburg, recently submitted a larva of the *Calliphora vomitoria* type, which had been recovered from the faeces of a man recently returned from German East Africa, where he suffered from dysentery and malaria.

In 1916 Dr. Salmon, Ladysmith, Natal, also reported a somewhat similar case. His patient had been eating ripe peaches and there was some possibility that the larvæ were those of the "fruit fly." The maggots when passed were of various sizes, some alive others dead. Another case of the same sort occurred at Ladysmith the year before. In neither were the insects diagnosed. It is possible that they were *Ceratitis* larvæ; but, if this were so, it is surprising that doctors do not more frequently meet with such cases as a considerable amount of maggot-infested fruit is consumed every year, particularly by children.

A case of facultative parasitism was brought to my notice in 1908. An Indian female, of Durban, on frequent occasions passed anthyomid-like larvæ when micturating. So far as clinical symptoms were concerned, this occurred without serious effect or inconvenience.

(CLAUDE FULLER, Pretoria).

—:o:—

THE FIG WEEVIL:—This insect is more generally recorded as *Metatyges turritus* and should be known as *Omophorus stomachosus*. It frequently attacks cultivated figs in orchards that are more or less in proximity to natural bush lands. In the case of such attack the egg is deposited in a very characteristic gash, gouged out by the female. In March, 1916, at Illovo River, Natal, I found the crop of a wild fig growing in the bush there thoroughly infested, every fig containing either a pupa or an adult preparing to emerge. Curiously enough it appeared as if each egg had been deposited in the "eye" of the fruit without any particular gashing.—(CLAUDE FULLER, Pretoria).

—:o:—

BEETLE *versus* BEETLE:—In the First Report of the Natal Entomologist, 1901, I recorded the large ladybird *Stictoleis instabilis* Muls., a variety of *S. 22. maculata* Fab., feeding upon *Galerucella triloba* Fabr. The latter insect was in great numbers on *Celtis Kraussiana* Bernh during the Spring of 1900. One tree in the Durban Botanic Gardens was grossly infested, and here the ladybirds, both as larvæ and adults, were feeding upon the larvæ of the *Galerucella* and the onslaught was so great and effective that the tree was not defoliated and few of the *Galerucella* arrived at the beetle stage of their existence.

Last Spring Mr. C. P. van der Merwe found the same conditions again obtaining on this particular tree. As it stood close to the potting sheds, I asked him to inquire whether in the interim other gross infestations by *G. triloba* had taken place but, so far as he could gather, no such one had been noticed since 1900.—(CLAUDE FULLER, Pretoria).

—:o:—

HIPPOBOSCA RUFIPES:—This fly seems to furnish an instance of a certain environment being essential to successful establishment. It is frequently carried with stock from one part of the Union to another, but does not become rooted to the new locality. How the fly is carried is illustrated by the following excerpt from a letter written me under the date of 11th November, 1916, by Sir Charles Saunders, Melmoth, Zululand. He says: "I am enclosing two insects from an ox which arrived here from the Free State yesterday; he was one of over a hundred head I have just got down and the only one on which we could find any of the insects. He left Swinburne, O.F.S., eight or nine days ago."

To my knowledge *H. rufipes* has been introduced at different times with stock to various parts of Natal, where it has never become established although it flourishes in certain parts of the Klip River county.

Mr. Rupert Jack also states that although it has sometimes occurred in large numbers at Salisbury, Rhodesia, in cattle brought up from Kimberley and the South, it fails to establish itself permanently.

Some years ago a *Hippoboscid* was introduced from Madagascar and scattered all along the main railway line from Durban. It excited a considerable amount of attention for a week or so because of its effect upon local animals. It is doubtful whether the insect became established as farmers, whose stock were much frightened by it at the time, assured me it had disappeared.

As some of the oxen were still on the ship in the bay at Durban when the matter was first brought to my notice, I asked the P.V.S. to have them examined. Many flies were found, and the evidence that they had travelled to Durban with the oxen was quite convincing.

(CLAUDE FULLER, Pretoria).



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*The BULLETIN of the
SOUTH AFRICAN BIOLOGICAL
SOCIETY*

Serial 7

SEPTEMBER 1918

No. 2

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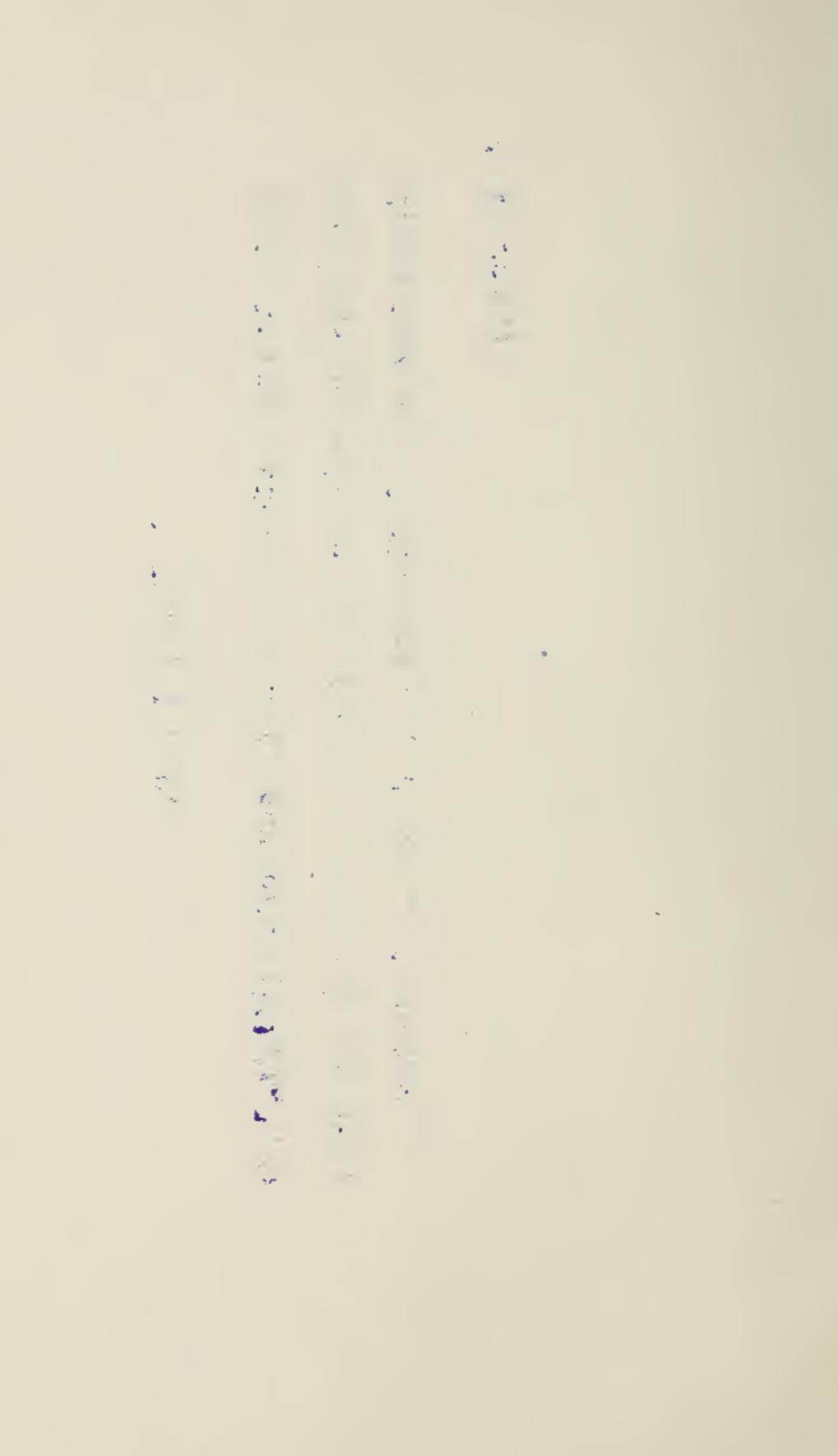
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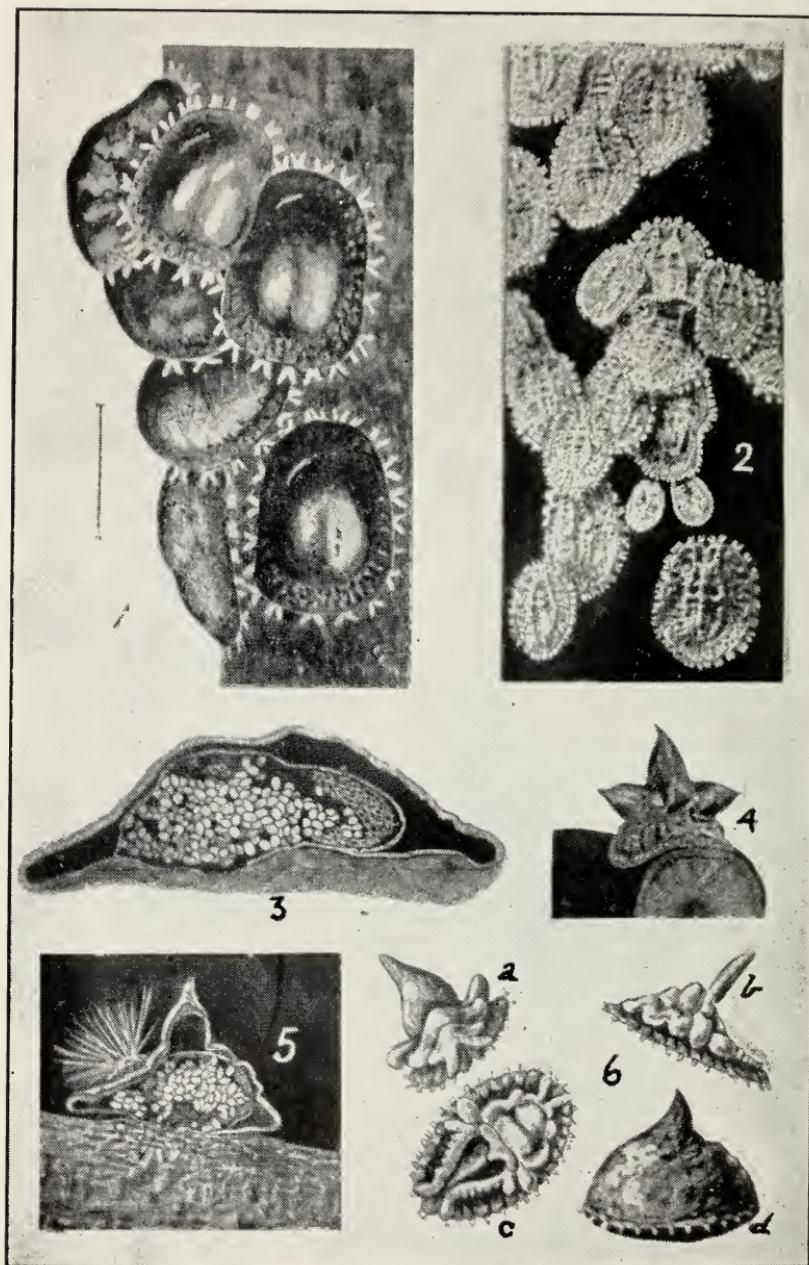
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~~Announcements~~:





South African Giant Scale Insects.

The BULLETIN of
The South African Biological Society

Series 1

SEPTEMBER 1918

No. 2

CURIOSUS AFRICAN COCCIDS.

By CLAUDE FULLER and C. K. BRAIN.

I. THE GIANT SCALE INSECTS.

The Coccids or Scale-insects are, as a whole, small creatures ordinarily arousing no more than the passing interest of most naturalists. To the uninitiated they would be contemptible had it not been shown time and again that so many kinds are, or may become under new conditions, remarkably destructive to plant life. To those who have studied their structure and unusual development they are known to be wonderful little insects presenting many interesting and instructive features and phases. Among a multitude of pygmies there are giants, and these compared to their many relations are somewhat as an elephant to a rock-rabbit or a baobab to a rose-bush. It is because they are monsters among their kind as well as because they present a remarkable development that the Giant Scale-insects have been chosen to introduce to readers of this Bulletin a series of notes upon our more curious kinds.

"Coccid" is a word derived from the Greek *kokkus*, meaning a berry, but which was at the same time applied by these ancients to a berry-like creature which lived upon the holly and

EXPLANATION OF PLATE.

1. *Aspidoproctus maximus*, group of adult females (reduced $\times 0.06$).
2. *Aspidoproctus maximus*, group of young females (natural size).
3. *Aspidoproctus maximus*, section of adult female ($\times 2$).
4. *Aspidoproctus tricornis*, adult female ($\times 2$).
5. *Aspidoproctus tricornis*, section of adult female with a larva ($\times 2.6$).
6. *Aspidoproctus mirabilis*. *a*, end view; *b*, side view; *c*, dorsal view of young female; *d*, side view of adult female ($\times 2.5$).

from which a dye had from time immemorial been obtained. From the same source, but less directly, we obtain the term "cochineal" given by commerce to the dried up bodies of the prickly-pear scale-insect, *Coccus cacti*. Coccids are popularly referred to as "scale insects" either because so many resemble small scales or because so many protect their bodies with scale-like shields. The term, however, is not descriptive of all kinds, as a number cloak themselves with flocculent down or with thick incrustations of lac or wax, whilst some encase themselves in pearly shells or burrow into the bark of trees. Then, again, there are those that cause their host-plants to produce the most extraordinary woody galls within which the insects live, and from the inner walls of which they draw their nourishment.

Scale-insects may, therefore, be naked or protected; but, in whatever form, all will be found to subsist upon the juices of plants and none are parasitic on animals. They form a self-contained family of plant bugs, and exhibit many aberrant characteristics. All begin life well provided with legs, antennae, and suctorial mouth parts, and practically all degenerate in one way or another to a greater or a less extent as they approach the adult stage. The males acquire two wings, they are as a rule minute and fly-like, but possess no mouths. The females, on the other hand, almost regularly exhibit a degeneracy of certain parts; the legs tend to atrophy and to disappear, and almost without exception the fully developed female becomes stationary.

The Giant Scales all belong to the genus *Aspidoproctus*, and are naked, gaining such protection as they require from the hardening of the integument. About a dozen species are known, and all are African, all the females are bizarre in one or the other stages of their existence, and the males of the largest species are 5 mm. long with a wing-span of 13 to 15 mm. These males are, therefore, nearly as large as the males of the extraordinary Australian genus *Callipappus*, coccids to which the term "Paradise flies" was given on account of the elegant brush of glassy filaments forming the tail. The young of the Giant Scales are remarkable for the plume of glass-like filaments borne upon their backs, but such a feature does not characterise the males nor more mature females. These young creatures are thus clothed in order that they may be the more readily wafted about in the air and distributed to new host plants so that the species may not be exterminated by natural enemies or with the death of a host plant.

When adult, the females are remarkable for the invagination of a part of the lower surface of the body, that region which is applied to the bark of the plant. Into the pocket so formed the

eggs are laid and in it the young hatch, these by creeping below the dried body of the parent enter the outside world. This invagination, or the formation of a marsupium, is a feature not ordinarily met with among coccids, but it finds a parallel in the Australian genus *Callipappus*, to which some allusion has already been made. The Australian insects are, however, active for a considerable period of their existence, and only become stationary late in life; with them the terminal segments of the abdomen are intussuscepted; that is, these segments are withdrawn within the body like the pushed in tip of the finger of a glove.

The greatest of our Giant Scales is *Aspidoproctus maximus* Newstead. A sketch of this creature is shown in figure 1, and the line drawn against the figure represents an inch. It may, therefore, be readily seen what a huge insect this is compared to ordinary scale-insects that are no larger than the head of a common pin. The largest females of this species measure 33 by 25 mm., and are 15 mm. high; one, therefore, occupies more than 800 times the superficial area occupied by our smallest coccid, *Aspidiotus gowdeyi*, and is, on a conservative estimate, 12,000 times bulkier. The young females, figure 2, are very flat and wrinkled. They are stuck to the bark like a postage stamp, and are peculiarly sculptured, presenting one of those intricate patterns to be looked for in an ornamental oval of crochet work. As the insects become more and more replete, the dorsal sculpturing is smoothed out until finally so little of it remains that the creature resembles an ugly black blister fringed around with pale prongs of secreted matter. When cut in halves, as in figure 3, each mature female is found to be composed of a shell enveloping the marsupium full of eggs, or eggs and young as the case may be, to the number of 6,000 or thereabouts. *Aspidoproctus maximus* was first found in 1908, near Salisbury, Rhodesia, in great numbers on the M'sasa tree (*Brachystegia randii*). It has several somewhat similar relatives. Two smaller forms are represented in the Union, both of which are remarkable for their peculiar appearance. Both occur on Acacias, one somewhat sparingly, the other at times most abundantly. The less common of these two is *Aspidoproctus tricornis* Newstead, which is to be found about Pretoria, a few scattered here and there upon thorn trees. This is remarkable for its three well defined horns, figure 4. In figure 5, *A. tricornis* is shown in section, and crawling upon the back of the parent is one of its young. The second species, *Aspidoproctus mirabilis* Cockerell, is a native of Natal and the Eastern Transvaal, and is frequently so massed upon its host plant as to smother large limbs and twigs. When replete, figure 6, *d.* the female is neither attractive nor bizarre except for the wooden-

like thorn that protrudes from the humped up body. But when half grown it has all the remarkable appearances that are shown in figure 6, *a*, *b*, *c*,, and a branch clothed with insects in this stage seems to be covered with a countless array of thorns, as the dorsal spines are hard and woody. *A. mirabilis* was first described from Natal, and placed in a new genus *Lophococcus*, now sunk as a synonym of *Aspidoproctus*, created a year earlier. It is interesting to reflect that, whilst *mirabilis* was described in 1901, it must have been collected many years ago, because in 1889 one of the writers remembers seeing, impaled upon a pin, a specimen marked "Distant, Natal," in the possession of the late Arthur Sydney Olliff, then Government Entomologist of New South Wales, Australia.

NOTES AND COMMENTS.

THE BULLETIN.—The first of our Bulletins has met with a most encouraging reception on the whole. There may be a few who have not approved of it, and to whom it appeared too popular. But it must be borne in mind that the Bulletin does not depart from the terms of the Society's constitution, and, however readable the articles contained were, all were such as would ordinarily find a place in our Journal of Natural History except that they might be interspersed with technical matter. Further, the articles were originally intended for the Journal, and selected for publication because, as a collection, they appeared of comprehensive interest. It is hoped to continue the Bulletin on the general lines of the first issue, and to reserve for the Journal the more technical papers submitted by members for publication. One of the objects of the Society is "to render all possible assistance to those in South Africa who are interested in the study of natural history." To do this it is necessary to have such a magazine as the Bulletin. We welcome to membership all who are interested in natural history; in short, those who love to know and understand Nature and her ways, but who are not necessarily scientists nor pretend to scientific attainments, and the Bulletin is for them. Among those of us who do claim to be scientists, and we are not in the majority in the Society, there is a general consensus of opinion that more good will be accom-

plished and the position of the Society strengthened by a magazine that appeals to a wide range of readers. There are, even in South Africa, many channels through which strictly technical papers may be published, but there is none in which general knowledge can be imparted to those "who are interested in natural history." Hence the Bulletin provides a common ground whereupon the scientists of this country may meet and assist those who desire to improve their knowledge and increase their interest. Nor are the advantages all one-sided, as the member who is interested is always an observer, and can give much information in exchange for what he gets. One of our reviewers described the Bulletin as "Science made pleasant." It is felt that if this motto is accepted in its highest sense the effort will meet a want and fill a useful sphere in the literature of South Africa.

THE JOURNAL.—In May, 1918, the South African Journal of Natural History was published by the Society in London. A few advance copies reached Pretoria in July, and the general distribution by the London agents followed. Before these notes appear all members should have received their copies except those who have more recently joined. Members who have not received a copy of the Journal should advise the Hon. Secretary. The second Journal will be prepared as soon as sufficient matter has been supplied by members. It is obvious that if no contributions are forthcoming there can be no issue, and members are invited to assist the Editorial Committee in this connection. In preferring this request, it is perhaps as well to indicate that for some time to come the Society will not be in a position to accept particularly lengthy nor copiously illustrated articles.

THE BLACK STORK.—In extension of his contribution in Bulletin I. on the Black Stork, Mr. R. E. Symons contributes a few further notes. He says: "In 1913 the storks failed to return to the old nest in Bamboo Hollow on the Giants' Castle Game Reserve, and it was not until 1915 that I discovered their new nest. This was situated in a krantz close to the homestead of one of the adjoining farms, and contained two fully-fledged young. The birds have returned to this nest every year since, and, on the 22nd September, 1917, four eggs were found in it. I have just returned from Northern Zululand, and there early in July I saw three Black Storks as they flew up from a muddy pool, where, doubtless, they had been capturing barbel, a fish which is very plentiful in all the pools and pans. Whilst I am acquainted with three different breeding places in the Drakensberg, I also know of a pair nesting in a krantz of the Uvombo Mountains. Eggs

have also been taken from nests in the Orange Free State. As several questions have been raised regarding statements contained in my article, I would like to discuss these at once. I mentioned the Black Stork as an African bird in the broadly accepted sense. That it exists and breeds in Europe or Asia does not necessarily disallow such a definition. In my own mind I feel satisfied that the birds I had under observation did not migrate out of Africa, but only to the warmer northern parts, and individual birds have been known to stay on in the south through the winter months. I described its colour as a uniform dark brown from the field naturalist's view point. It would have been better had I added a reference to the beautiful and glossy sheen that overlies the brown. The beak and feet of all that I have seen were light red, and could not be described as scarlet. Further, I understand that Mr. A. K. Haagner has seen specimens of this species of which these parts were a light pink. The feeding habits I reported may be taken as quite correct for the observations I made."

AN OMISSION.—On page 14, Bulletin I., from under the title "Birds about our Homestead," the name of Mr. Ambrose A. Lane's farm, "Mooibank," was inadvertently omitted. This should be borne in mind by those readers interested in the precise locality given for the species there under reference.

SNAKE STORIES.—The Rev. A. J. T. Bryant asks: "Did you ever hear of an antelope eating a snake? I have, and on good first hand authority. The snake was gobbled up whilst the huntsman was looking on, and subsequently it was removed from the antelope's stomach."

COBRAS AND MIERKATS.—Mr. H. Waldeck, Olivewood, Colesberg, writes: "I think that had Mr. Fuller left the animals undisturbed the mierkat would have killed the cobra. I once witnessed a similar encounter between what is known as the Witkwas mierkat or Cape Mongoose and a very vicious ringhals, a slatey grey snake with a white-banded throat and standing 18 to 24 inches. The mierkat assumed the same tactics until he saw his chance, and then he pounced on the snake and bit it behind the head. Before the snake could recover the mierkat was out of reach. The snake became more enraged, and when it struck its opponent was on to it again. In the end the snake was killed, and the mierkat carried it off about 100 yards and then ran away. I went and looked at the snake, and could see the marks of the kat's teeth on it, just behind the head. When I left the mierkat

came back and dragged the snake further away. These particular mierkats differ from the other two we have insomuch that they walk, trot and run like a dog, whilst the other kinds hop along."

SNOWSTORM AT REITZ.—Dr. R. Leigh, writing from Reitz on the 13th of August last, remarks: "An extraordinary fall of snow occurred in this sub-district on the first of the month. Its effect was seen in the broken branches of the trees; two that were broken in my garden were about the thickness of the thigh of an average man. Birds died in great numbers, and on a neighbouring farm the natives collected them by the sackful. These were chiefly small finches. The snow lay for two days over most of the land locally and in more isolated places for three days."

A QUESTION OF NAMING.—Mr. A. J. T. Janse contributes the following note: "In the first Journal of the Society, page 107, Mr. S. G. Rich pleads for the preservation of certain Bantu words applied to insects by the Zulus. He proposes to accomplish this by employing such terms as specific names for new species, and invites other entomologists to follow suit. Whilst it is true that a specific name is no more than a symbol or a combination of letters by which an organism may be recognised in literature, I gravely doubt the desirability of making a practice of taking collective nouns from the vocabulary of but a section of the aborigines of South Africa. Personally, I hold that the guiding rule should be to select a term of Latin or Greek origin that will record some important character. Such a term possesses a double advantage, it is an aid to memory and is intelligible to students of all nationalities. In short, it is utilitarian. Neither do I hold with the choosing of terms because they happen to be euphonious or just for sentimental reasons. The practice of naming an insect or other organism after a person, so often leading to cumbersome combinations, should be generally avoided and only indulged in when it is necessary to reward or encourage, in a small way, the one who took the trouble to collect this or that or who was otherwise associated with the study of it; personal names are not intelligible to many present day workers, and are bound to become meaningless as time goes on. Locality names are less objectionable, but the use of such, as also of persons, should be but sparingly. A term expressing some specific character and derived from a Latin or Greek root will help to make nomenclature less of a burden to the systematist of to-day and of the future. Names

such as 'intotoviana,' 'ujekomanzi,' etc., are proposed by Mr. Rich, but they can only be intelligible to some of our natives and to students of Bantu. They are collective in their sense, there is nothing specific about them, and they are not suitable for group names. Naturally, every systematist enjoys a wide liberty in his choice of specific names, and he may spell them as he pleases. Therefore none can prevent the employment of *Trithemis ujekomanzi* for a certain dragonfly, although readers of Bantu may not find it delectable. But, if we are to perpetuate trivial names, why not *Trithemis dragonfly*, *T. glazemaker*, *T. erdfliege*, *T. naatdekkoker*, or *T. wasserjungfer*?"

SUICIDE BY SCORPIONS.—Mr. C. N. Knox-Davies submits the following "With regard to Dr. Breijer's observations on an act of suicide by a scorpion, is it quite correct that this had not been noticed before? I recollect when quite a child being told that a scorpion would kill itself when injured, but cannot remember the source of information. In any event, the following lines by Byron may be unknown to Dr. Breijer, and would seem to show that there is a popular belief to bear out my statement. I am quoting from memory, and trust to be pardoned for any errors:

The mind that broods o'er guilty woes
Is like the scorpion girt by fire,
In circle narrowing as it glows,
The flames around their captive close,
Till maddening in her ire,
One sad and sole relief she knows:

The sting she nourished for her foes,
Whose venom never yet was vain,
Gives but one pang and cures all pain
And darts into her desp'rate brain.
So do the dark in soul expire
Or live like scorpions girt by fire,
Darkness around, despair within,
Unfit for earth, unloomed for heav'n."

PUBLISHING.—It should interest members of the Society to know that the Specialty Press of South Africa, Ltd., is always prepared to consider the publication of books of general interest upon Nature Study. Any member who desires information, etc., should communicate with the Manager, P.O. Box 3958, Johannesburg.

SOUTHERN RHODESIA

AS A HUNTING GROUND FOR INSECTS.

By A. J. T. JANSE.

In December, 1917, and in the beginning of 1918 an old wish of mine to go to Southern Rhodesia to explore its rich insect fauna was at last fulfilled. I arranged a trip by rail so as to cover a large field and to select localities for future and more detailed study. The following notes apply, therefore, only to country near the railway, and I offer them hoping they may prove a guide to the intending collector and student and help him to select places of special interest. I can safely say that Southern Rhodesia is to all intents and purposes a virgin field and one which will yield specimens of great scientific interest in nearly every part. It will be remembered that the time of my visit coincided with an abnormally wet period, especially in the eastern part of Rhodesia, and this no doubt had a direct bearing on the aspect of the country as well as upon the collecting done. Notwithstanding the adverse weather conditions, a collection of over 4,500 Lepidoptera was brought home, and this does not include the species common all over South Africa. The collection comprises close upon 1,000 species, of which I think over 300 are undescribed. That such is the case certainly speaks volumes for the richness of Southern Rhodesia, especially when it is remembered that only two months work was done. Certainly the result is an incentive to make more energetic efforts to get a better knowledge of the flora and fauna of this enjoyable country.

The landscape round about Mafeking, and in fact all along the line to Bulawayo, is not very inviting to the entomologist. The country is flat, usually rather bare, or at best covered here and there with low shrub and acacias. Only in the neighbourhood of Bathoen and Gaberones does the country become more hilly; thereabouts the acacias are more tree-like and interspersed with an occasional tree, one of which I took to be *Ochna pulchra*, or a high-stemmed aloe breaks the monotony of the landscape. Beyond Gaberones the trees disappear and a fine dust penetrates the closed windows, reminding us that we are on the verge of the Kalahari. A change occurs at Palla-road; here and beyond, fairly

high individual trees thrive in a grass-covered land. Passing Bonapitsi, I noted it a place worthy of a few days collecting, as it looks like an oasis and promises some peculiar forms of insect life; in fact, a little later I caught a few moths in the train which had been attracted by the electric lights. The Bulawayo environment is not inviting. At best, low shrub and grass is all that is to be seen; and, at that time these were in poor condition, rains had recently fallen, but to such an extent that some parts looked like marshes. The country between Gwelo and Umvuma was the next section travelled through during the daytime. At first only acacias are to be seen; but beyond Senale these gradually disappear, and give way to groups of high trees with thick shrubby undergrowth, like islands surrounded by a sea of grass. Here the grass is usually very high, and the vegetation as a whole indicates a more abundant and regular rainfall. Indiva, in particular, looked very promising; it had been raining for hours, and when this point was reached the sun was just coming through the clouds and hundreds of dragonflies were seen flying to and fro in their peculiar business-like manner. Further on, a few proteas were seen, and beyond flat rocks cropping out, making large open patches without a blade of grass except in the crevices between them. Lalapansi, Iron Mine Hill, and Gobo Halt all seemed to me splendid places for collecting, trees being near to the few houses and the railway line. This sort of bush extends to Umtali and a good distance beyond. At Umvuma I collected for about five days with very good results; but one must stay on the eastern side of the copper mine as on the western side all the vegetation has been killed by the sulphur fumes. Hereabouts, the vegetation is fairly rich and varied, especially towards a place called Blinkwater. Several moths were obtained at Umvuma which I did not get anywhere else.

On the railway line from Gwelo to Salisbury several good collecting grounds suggested themselves. As on the Umvuma line, the first part from Gwelo is less interesting, acacias being the most conspicuous plants. Near Hunter's Road, so named in memory of the famous Selous, the typical Rhodesian bush is entered, and this is only interrupted here and there by less luxuriant vegetation. The country is more undulating, and has necessitated cuttings for the railroad. Both Hunter's Road and Queque seem to be good collecting grounds. Here onwards the trees reach 20 to 30 feet, a bare field is but seldom seen, and it would be difficult to make a choice almost right up to Salisbury, as the whole stretch seems equally good. Hartley (3,900 ft.) offered a promising field, and I much regretted being unable to do some collecting there.

The surroundings of Salisbury are not ideal collecting grounds, though a few scattered localities have certainly proved good for local entomologists. At Emerald Hill, however, I did some good night-collecting: here the vegetation, as well as at Hartmans' Hill, is very varied and often comprises very big trees. This is where Father O'Neil found the many Saturniid caterpillars which he reared with so much success, and I was shown the places where the first eggs of *A. semialoba* and the larvae of *B. heroum* were found by him.

From Salisbury to Umtali the rail carries one through very interesting country. The proteas with their white flowers make an early appearance, and the boulder-hills give an aspect to the country calling to mind some of the northern parts of the Middelburg district in the Transvaal. The huge boulders of granite, often of fantastic shape, form gigantic mounds, on which rocks and vegetation intermingle in pleasing contrast. Everywhere along the line the typical Rhodesian termite hills are abundant. These are often six to ten feet high and of wide diameter; usually they are covered with grass and shrub and even trees. It seemed remarkable that the grass on these hills was of a much brighter green and looked quite fresh and succulent compared to that surrounding. Marandellas station appeared to me a place well worth a better acquaintance, as the surroundings are well wooded and collecting could be done near the station. From Matinidza to Rasapi the train runs on the fringe of a table-land: the eastern side shows low lands with mountains in the distance, on the western side are highlands or flat country with hills of heaped up granite rocks at intervals. Malenje, and especially Odzi, are beautifully situated; the latter place must be excellent for collecting, as the vegetation gives evidence of a good rainfall and low altitude. Odzi is in fact the lowest place until Umtali is passed.

Umtali is nicely situated near high mountains, and, in general, both town and mountains reminded me of Barberton, except that the former is farther away from the mountains, about three miles. I am told that on the western side of the mountain lies the fine Penhalonga Valley, said to be peculiar for its vegetation: however, I had no opportunity to visit it. For nearly two weeks I camped out in "Meichel's jungle," a nice patch of wooded mountain-slope. This place proved very profitable; although I was restricted to camp-collecting, owing to the rains and the absence of a boy or somebody else to look after the camp, I obtained during twelve days over 1,500 moths, several of which were new to me. Father O'Neil visited the spot I had selected for my camp about a month later, and declared it to be the best collecting

ground in the neighbourhood of Umtali; he, too, secured several rare and new things at this place. Umtali would be an ideal collecting place for a naturalist resident there, and the fauna certainly has peculiarities of its own. Umtali is protected on the western side by the mountain ranges and open to the rain-bearing winds on the eastern side, as is well testified by the lop-sided growth of the trees in the streets, and the climate is humid all the year round. Several insects typical to the lower lands of Portuguese territory must be blown inland, to accumulate in the mountain vegetation where I collected. For ten of the twelve days it rained throughout the greater part of each and a good portion of the night as well. Taking this into consideration, the place must be regarded as very rich in insect-life. Collecting was done, as elsewhere, for practically the whole of the night, usually up till 4 a.m. Blue monkeys are plentiful here, and were heard passing from tree to tree, but the foliage is too thick to see them clearly. Baboons were at times abundant, and one morning a troupe of over a hundred, big and small, had practically surrounded the camp, and were squabbling so near to the tents that I had to frighten them away in order to get some sleep before the day became too hot. It required several shots before they decided to leave me alone, and then they were not in a hurry; one of the big ones even remained in an adjacent tree until most were gone and a revolver bullet whistled too uncomfortably close by.

The next place I visited was Hope Fountain, about 15 miles south-east of Bulawayo. The route to this place was not very interesting, except for the little isolated clumps of vegetation, each of which is situated at a termite's nest and surrounded by grassland. My friend, Mr. Neville Jones, who resided here for some time, thinks that a termite's nest is the beginning of a bush-island, the termites either make the ground more fertile or bring fertile soil from lower layers to the surface. Perhaps the presence of the termites attracts birds, and these, in their turn, bring seeds from elsewhere, which find a fairly loose and moist soil in which to germinate.

Hope Fountain itself is not a particularly good spot for collecting, but I got more and better material there than I expected. For two nights I also collected at Mr. Rork's farm, called "Eman-genie," and during the first night, especially, I had splendid results, obtaining several new forms. In fact, I could have caught hundreds of fine specimens of species of which I had only secured a few up to then. Although it rained heavily during the whole of the first night, more than a thousand moths were attracted by the big light, and yet the following night, when it rained less, but

when there was more wind, I had poorer results. The vegetation of Hope Fountain is more of the thorn-bush type.

The last part of the trip was to the Victoria Falls. At first the journey did not prove very interesting, as, up to Highfields, the vegetation is rather monotonous, mainly consisting of acacia. From Highfields to Ischontanda I travelled during the night; and, on rising at this place early in the morning, I found the landscape entirely changed, the rail cutting its way through forest such as I had not previously seen in Rhodesia. Here the trees are from 20 to 40 feet high, with straight stems of over a foot in diameter, and standing about 20 feet apart with the intervening spaces often filled with shrubs, but more generally covered with grass. Several small stations and sidings were passed that look very inviting to the entomologist and botanist. Wankie might also prove an Eldorado to the naturalist, as the hills of this locality are well wooded. In this region the Baobab trees began to put in an appearance, but only as small and middle-sized trees, and palms about five feet high and with blue-green palmate leaves are conspicuous all along the line. Deca, where a stop is made for water just beyond Wankie, should be a very good spot, as the vegetation is just as rich and one is away from the electric lights of that village. Katuma was the next spot passed where I would like to spend about a week in collecting; forest was everywhere except for the small cleared space around the ganger's cottage. From Deca to Katuma the scenery is grand; the country is hilly; or even mountainous, and hill and dale are densely covered with a great variety of plants. Big Euphorbia trees in large numbers were seen here for the first time during the trip. Towards Metetsi the trees are shorter and gradually replaced by shrubs, though there appears to be plenty of water and in some places the water lillies (*Nympha*) were abundant and in full bloom. The country traversed becomes more flat, and in the east low flats, covered with dense bush, extend to the horizon; gradually the shrubs are replaced by trees, some even to great height and thickness.

The Victoria Falls offer many attractions to the naturalist as well as the lover of Nature; the vegetation is luxuriant, especially near the river, and the place must undoubtedly be rich in insect life. I was, however, not as successful as I had hoped, and, though I spent practically a whole night in the well-known Rain Forest, I got very little for my trouble, except that some of the micros were new and interesting. It was moonlight and without doubt this, even among the dark thick foliage, lessened the attractiveness of my lamp; perhaps the moonlight, reflected by the millions of drops on the dripping foliage, was responsible

for this failure, notwithstanding the darkness under the trees. Still that night in the Rain Forest was delightful after all. The dense mysterious darkness, the mighty falls thundering only a few hundred feet away, and now and then sending a misty rain into the collecting tent, the soft moonlight just strong enough to illuminate and beautify the foaming water leaping into the 400 feet deep chasm, and the loneliness, made a never-to-be-forgotten impression of this monument of Nature. Not even the most enthusiastic entomologist could have been disappointed, however long his vigil or however poor his bag, under such conditions. Most of the other nights spent at various places in the neighbourhood of the Falls proved equally fruitless, only a few dozen specimens compensating many hours of patient waiting. As it rained very often in the daytime, very little daylight-collecting could be done, and when done it was usually attended by a drenching and an almost empty collecting box. Some good things were noticed now and then about the electric lights of the hotel, and I feel sure that a few favourable nights would have given a good bag. A few of the islands of the Zambesi, like Kandahar and Syatsikola, were visited, and several good moths, mostly new, were secured by daylight, but, owing to the moonlight, I did not think it worth while to spend a night on any one of them. The vegetation of these islands is simply beautiful, and I feel sure that the fauna must be correspondingly unique.

My last collecting ground was Sawmills, about 57 miles from Bulawayo on the Victoria Falls line. This place, recommended to me by Dr. Arnold, is peculiar in many respects. Except near the river, the soil consists almost entirely of sand, with very little clay in it, and the vegetation is correspondingly singular. This is one of the few places near Bulawayo where the Rhodesian teak flourishes. Very few big trees remain, but the fact that a sawmill has been kept going for many years shows that the place must once have been plentifully supplied with good-sized trees. The surface of the country is fairly regular, here and there undulating: one of the theories I gathered regarding its geological formation is that it was made by the sand blown from the Kalahari. The bigger trees, mainly Rhodesian teak and "Makwa" (*Pterocarpus angolensis*) are found far apart, and the spaces between them are filled up with shrubby undergrowth and grass. For hymenopterous life, especially ants, I think the place is ideal, and for collecting Lepidoptera at night the locality also proved quite profitable. Daylight collecting was not as good as might have been expected from the vegetation. Very few butterflies were to be seen, and flowers were conspicuous by their absence. Several new moths were caught at night, some of which are of

great scientific interest, and my last collecting night in particular produced specialities which I had not taken before. Here I brought my operations to an end, and, though the weather had throughout been very adverse, I had every reason to be content. My success and the charming landscape led me to resolve, even before I started to return home, to pay this country another visit as soon as I have the opportunity. At present I am making plans for a trip during the coming December and January, this time across country from Victoria to Umtali far away from the railway, including a visit to the famous Zimbabwe ruins and through country which is a "terra incognita" to the entomologist. Perhaps more hardships will be met, but I feel sure that the result will amply reward all the expense and trouble. Southern Rhodesia cannot disappoint the naturalist at any time and under any conditions. If any of the members of the Society would feel inclined to accompany the writer on this trip, full information will gladly be given. I conclude with expressing my sincere thanks to my Rhodesian friends who endeavoured and succeeded in making my first acquaintance with their charming country both pleasant and profitable; their advice and assistance were important factors in securing the interesting material I had the good fortune to bring home.

A MAMBA INCIDENT.

By EDWARD SAUNDERS, J.P., Tongaat, Natal.

There has long since existed a controversy as to whether the green and black mambas are one and the same species or whether they are different. In this connection the following incident may be of interest:

On one occasion I heard a great chattering of birds in a tree near the house. This always indicates danger of some kind; either a hawk, a snake or some other creature of which birds are afraid is about, and, when such is detected, all kinds make common cause and twitter and chatter to call attention to the fact. I went out with a gun and saw a green mamba wriggling about in and around a forked branch of the tree. I did not know why it was behaving like this, nor could I quite make out what was the object of its contortions. Evidently it was making no effort to attack the birds, which, in their excitement, were flying round close to it; nor did it appear to take much notice of me, although I was well within its vision. After watching it for a time, I thought the best thing to do was to shoot it, and this I proceeded to do. On being hit, its contortions increased considerably, but they soon subsided, and the snake gradually came down headlong to the ground close to where I stood. Imagine my astonishment when in place of the green mamba wriggling about on the tree I shot at, there, lying at my feet, was a black mamba beautifully shiny and glistening. I did not at the first moment grasp the meaning of this, but, as soon as I was satisfied the snake was dead, I looked at the fork in the tree, and there to my surprise was a newly shed skin quite fresh and still green. I got the skin, but the colour faded at once. Before this I had doubted the identity of the two snakes.

Shortly after I had a further experience, and this appeared to confirm the view that the black and the green are one and the same reptile. In the ceiling of the old Tongaat house to my horror I found a large black mamba, and as this particular room was my bedroom, I did not leave that snake alone until I killed it. In doing so I had to get down half the ceiling. A few days after a second black mamba was killed not far off, and, within a very short time, a nest of eggs hatched out in a crevice of the wall of my bedroom. These eggs had not been seen at the time the snake was killed. Now, it is a curious fact that the young snakes were all green. It seems to me the eggs were laid by the black snake I had found and killed in the ceiling: and, if I am right, the offspring in place of being born black are born green. This rather points to the black being the older and the green the younger of the same species.

THE BLUE OR COMMON HERON.

(Ardea cinerea).

By R. E. SYMONS, Howick, Natal.

The Bushman's River has its source on the Giant's Castle Game Reserve, in the Drakensberg. It is noted for the number of brown trout it contains, and lovers of the gentle art who visit its waters may be sure of the very best of sport. Trout were originally introduced into Natal by Mr. J. C. Parker, of Tetworth, and at the present time most of the Drakensberg streams are literally swarming with these beautiful fish. Mr. Parker is certainly deserving of great credit, as, by his untiring efforts, he has provided for the people of Natal one of the oldest and most popular of pastimes, i.e., trout fishing with artificial flies.

Any person proceeding to the Bushman's River on the Game Reserve, armed with rod and reel in search of the early morning rise, will invariably find there before him one of Nature's fishermen, who, although unprovided with artificial means, is as patient and expert an angler as the most ardent and enthusiastic follower of Isaac Walton. I refer to the Blue Heron, which is common in most parts of Natal, especially near the Drakensberg, where most of the small streams have a plentiful supply of trout and scale fish. These birds are very plentiful in the Game Reserve in question, where they consume large numbers of trout every year; they are also partial to frogs and crabs, of which there is a plentiful supply in the Bushman and other mountain streams. The method of capturing its prey usually adopted by the heron, in the Game Reserve, is to stand motionless on the edge of some convenient pool or in the water at the head of shallow rapids until an unfortunate fish, frog or crab ventures within reach of its deadly beak. In the twinkling of an eye the heron makes a downward thrust and the game is secured. That he is not always successful in killing his prey one learns from the number of trout that have been seen with ugly wounds on back or tail, caused undoubtedly by the very serviceable beak of the heron. These birds invariably keep to the same pool or portion of the river in search of food; they reach their hunting grounds before daybreak, and may be found fishing off and on all through

the day, especially when three or four hungry youngsters have to be fed. Where fish and frogs are not so plentiful, the heron will often be seen stalking silently through the long grass in search of grasshoppers; snakes are also seized and devoured when opportunity offers.

This heron possesses marvellous eyesight, and it is very difficult indeed to get close enough to watch it fishing; however carefully one may wriggle or crawl along the ground, it will invariably fly off just as you are settling down in comfort to watch. With the object of observing a heron at work, I once built a screen of branches within a few yards of a favourite pool, and to this made my way one morning before daybreak. Scarcely five minutes had elapsed after I had made myself comfortable, than, happening to glance towards the pool, to my surprise a heron was standing there, having arrived without creating the slightest sound. Although it was still fairly dark, the bird very soon showed signs of uneasiness, and, wading through deep water until practically swimming, made its way to the lower end of the pool, and from there flew off noiselessly down the river. Later it was again disturbed while patiently watching a good trout pool. When on patrol in the Game Reserve I have often come across herons, during the heat of the day, quietly guarding some secluded pool or favourable rapid. A heron is distinctly amusing when suddenly surprised. At the best of times its flight is very clumsy and ungainly: but, when in an extra hurry to start, its efforts are comical; it appears to proceed with a series of jumps and jerks and only when well on the way does its flight become at all even. Although appearing so clumsy on the wing, the heron is nevertheless very powerful, and can fly for a very great distance. In the mountains during the quiet of the evening, the trout angler, intent on casting his flies to the best advantage, will often be startled by hearing a hoarse cry overhead. This, in the first instance, he may probably take to be that of some wild animal. But there is no necessity for alarm; it is only the Blue Heron on the way home to roost after a hard day's fishing. The first to commence in the morning, so is the heron generally the last to leave the stream in the evening.

The majority of trout fishermen regard the heron as a great pest owing to the quantity of trout it consumes; it is fortunate for the bird that it is protected by law, otherwise a great many would be destroyed, every year. It must be borne in mind, however, by those who advocate the destruction of all trout eating birds, that most of the Drakensberg streams are swarming with either trout or scale fish, in fact they are overstocked. Therefore, the herons and other fish-eaters, such as the Black Stork

and Giant Kingfisher, by tending to keep down the increase, do far more good than harm. Both the indigenous as well as the imported fish are devoured with equal relish, and individuals of both species have been seen in the nest of a Blue Heron. The fact that it destroys scale fish should gain a little favour, as these fish are a source of great worry to trout anglers on the lower reaches of the Bushman and other streams.

Four or five pairs of herons have their nests in a small patch of bush on the Game Reserve, and to this they return every year. The Blue Heron is very fond of the company of his own kind; the nests are generally built within close proximity, and as many as three have been observed in the same yellow-wood tree. Usually the highest part of a dead yellow-wood is selected as a suitable site for building, and so it becomes impossible, without risk to life or limb, to reach the eggs or young. The nest is built of sticks and twigs, without lining of any sort. It is wonderful how the birds succeed in getting the sticks to hold together; these appear to be jumbled in a heap in the most careless fashion, and yet, when completed, the nest will withstand the strongest of winds. The eggs are of a pale blue colour, about the size of a hen's; they are usually laid in August, and vary from three to four in number; in some instances only two eggs are laid. Herons are not easily disturbed, and, should the contents of a nest be taken early in Spring, more often than not in two weeks' time the nest will again contain eggs. On one occasion two eggs were found in a nest and one was taken; some weeks later the nest was again visited, when it was found to contain two eggs and three young birds. In this case it would appear two pairs of herons were endeavouring to occupy the same nest. In an adjacent dead tree there were three more nests, all of which contained three or four eggs or young. Young herons are easily reared in captivity, but they do not make agreeable pets, being vicious, and, where young children are about, they are a source of danger. Although in the Drakensberg, herons usually commence laying in August, eggs are often to be found in September, and fresh eggs have been seen in October and even as late as November.

Mr. A. H. Winter, of Klipfontein, Frere, Natal, tells a good story of a fight which he witnessed between a Blue Heron and a snake. He was riding across the veld one morning on his way to his maize fields, when he saw a heron solemnly stalking along through the grass. Suddenly a good sized Natal Cobra rose up with outspread hood in front of the bird. In an instant the heron was on the alert, and commenced hopping round the snake as if on springs, using the wings both as a shield and as a weapon

with which to flick the head of her formidable adversary and so bewilder it. This went on for some time, the infuriated reptile making vain efforts to inflict a deadly wound on his nimble antagonist. Finally, the heron's opportunity arrived; like lightning the powerful beak shot out, and the bird seized the snake by the head and swallowed it. Mr. Winter saw this take place from a distance of not more than thirty yards, and I can vouch for the truth of the story.

ON A VISIT TO NAMAQUALAND

By F. THOMSEN, Division of Entomology, Pretoria.

To the west, bordered by the waters of the Atlantic, lies a wide stretch of territory called Namaqualand. This is bisected by the broad waters of the Orange River, as they roll their way to the sea. South of the Orange the country is called Klein Namaqualand, and forms the most western area of the Union. To many in South Africa little is known of the nature of this country, and to most of those who give it a thought it exists as a land of many drawbacks, waterless and inhospitable, where few go but those who must and none by choice. But Klein Namaqualand is not so bad as it is made out to be. It is not uninhabited, not without its cultivated areas, and at times, perhaps few and far between, becomes a veritable Paradise. Normally, Namaqualand as a whole is comparatively rainless, but occasionally, perhaps only once in ten years, it enjoys a season of plenty. Then rains fall abundantly, and erstwhile dry water courses become running streams and mother earth yields a bounteous harvest. Then, indeed, is the face of Nature changed, and I count myself fortunate that an otherwise prosaic journey should have coincided with that conversion of the country which rain alone can bring about. In August of 1917 I went there in connection with the locust campaign of the Division of Entomology, seeing farmers and officials regarding essential but uninteresting details, travelling hurriedly from place to place, and always passing with regret, and no more than a fleeting glance, a hundred and one of Nature's beauties.

My first objective was Springbok, to reach which I travelled from Pretoria to Cape Town and thence to Klaver, the railhead of the line that runs almost due north through Piquetberg and Clanwilliam. The latter part of the journey covers 208 miles, and occupies the best part of a night and half a day. From Klaver I went via Van Rhynsdorp, Nieuwe Rust, Garies and Bowesdorp, arriving in Springbok on the 26th August, having left Pretoria on the 19th. Later I went to Bushmanland, visiting Steinkopf, Goodhouse, Pella and Namies. From Klaver to Van Rhynsdorp the journey was by post cart, but the rest of the tour was made by motor-car and mule cart.

Van Rhynsdorp was reached upon the 22nd of August. The village stands on a fairly flat sandy plain, which lies at an elevation of about 800 feet above sea-level. Only in the far distance, towards the S.E. and E., can any mountains be seen. Southward are the Matziekamma; more eastward the long ranges of the Kobe and Bokkeveld Mountains, which form the eastern fringe of the Calvinia plateau. The mesembryanthemums were in full bloom, carpeting the country with a colour scheme of great beauty, the blossoms ranging from deep purple to the palest of pink, some almost white, and interspersed here and there with patches of the orange and yellow of a gousblom. Leaving Van Rhynsdorp for Nieuwe Rust, the first part of the journey proved uninteresting, as, for about 46 miles, it represents Karroo veld and the vegetation peculiar to such country. Houses are few and far between, a fact that is due to the brakish nature of the soil, even the drinking water being salty. On our way we crossed a river, said to be a perennial stream, of which the waters are more salty than those of the sea. Nieuwe Rust is a small place of about ten houses, and is near the farm "Mierhoff Kasteel," named after Mierhoff "the Leech" who accompanied Van der Stel, when, hundreds of years ago, he trekked into the far north to see the Koperberg to which to-day the narrow gauge Ookiep railway runs by tortuous paths from Port Nolloth. All along this route one passes farms whose names are derived from this incident of far off days. Leaving this village, to which we had journeyed in a downpour of rain the day before, we found the roads somewhat slippery, but the clouds had cleared away and the country was bathed in sunshine. Soon mountainous country was entered upon, the roads winding round high koppies and ever climbing higher and higher. We found it steepest just beyond Garies, a village nestling among the hills, and boasting a bank and a post office. Although steep and narrow, it is a good motor road, and at that time water abounded everywhere. Bowesdorp was reached rather late in the afternoon. This is a very small

village in a deep kloof among the high hills of the Komiesberg. It prides itself in possessing the oldest Dutch Reformed Church in Namaqualand and a helio station and in being in the proximity of the highest peak of Namaqualand. That night, after negotiating some nasty stretches of road, including the narrow and steep Bourke's Pass, Springbok was reached, and the road journey of 225 miles from Klaver completed. Springbok, like Bowesdorp, is small, and also lies amongst the mountains and in a kind of pass. It is a name, a few well built houses and some pepper trees.

The drive that day from Garies to Springbok was a journey through fairyland. The veld was wonderful, the views such as one could never forget nor ever wish to do so. Only the brush of a great artist could depict its loveliness, but never succeed in portraying more than a glimpse here and there of the panorama of colour, of the full riot of orange and yellow, of pink, white and purple. None but he who has seen can ever quite appreciate the sight, and I was indeed grateful that it had fallen to my lot to witness this phenomenon of Nature. Add to the wealth of colour green fields of wheat and rye, of oats and barley, gleaming patches here and there throughout the land, and then the picture of hill and dale and of colour is at last supreme when there is caught, half way between Garies and Bowesdorp, a glimpse of the distant sea sixteen miles away at Hondeklip Bay.

It was evident that every farmer had taken full advantage of the unusual kindness Providence had bestowed upon his country. As one looked down long valleys many ploughed lands were to be seen and many fields of grain in ear. Certainly there are not many highways in the Union to compare with that I travelled over towards Springbok, nor from which so many fields of grain can be seen stretching away in the distance.

BUSHMANLAND.

Bushmanland is a part of Namaqualand; it is a flat country in the nature of a high and vast plateau. It extends eastwards from the Kamiesberg towards Kenhardt and southwards towards the Langeberg and other ranges of Calvinia. On the north it falls steeply into the valley of the Orange River. Through it a round trip was made. From Springbok I went to Ookeyp and thence due north by rail to Steinkopf. The rest of my expedition was made by mule-cart along roads on which, if one is well acquainted with the country, motor transport is practicable. From Steinkopf the route took a north-westerly direction to a spot called Weltdoon, lying among sand hills a few miles from the Orange River, then east, more or less along the river, to Goodhouse, and

on through 'Naroep, 'Ndabanoro, and Klein Pella to Pella. From Pella a southward turn was made towards 'Namies and Kalkvlei, and from there west, through the Game Reserve, to Springbok. At the time of my visit Bushmanland itself was in excellent condition, covered extensively with grasses in seed, their silvery haulms producing a sight seldom to be seen there. From a distance these grass lands look like so many vast lakes with their wavelets running lightly before the breeze. There are several nourishing kinds, the principal and most general being 'Ga grass (*Aristides brevifolia*), spelled "Toa" on old maps of the country;* also the grof and fijne 'Ndwa grasses (*Aristides uniplumis* and *A. obtusa*). Locally, all these are called Bushman grasses.

It is curious that, although on the north the plateau falls away rapidly towards the Orange River, its main drainage is eastwards as represented by the dry Koa Valley. The northern edge of the plateau breaks into the chain of mountains through which the river runs, and this is cut through by many gravelly water courses leading north into the river. These mountains are practically bare of vegetation, barren rocks with but an odd bush here and there and an occasional kokerboom (*Aloe dichotoma*), which I understand is peculiar to Namaqualand. Upon the whole this mountainous region suggests a landscape in the moon rather than anything else. Approaching it from the Bushmanland side, one is first struck by patches, like snow-drifts but red in colour, on the mountains. On coming nearer, these are seen to be the topmost limits of great sand dunes banked against the foot hills. The sand from the dunes blows about a great deal in the wind, but the dunes are said to be more or less permanent, seldom altering their position, as is the case in the Kalahari and other parts. This sand does not seem to travel regularly through the mountains, although in the neighbourhood of Pella I saw a pair of long straight dunes extending northwards some ten to twelve miles, which had been formed of sand blown through a nek in the range of hills. This I was told was practically unique.

Goodhouse lies on the Orange River, and it and the neighbouring farms belong to the Orange River Ostrich Syndicate. The improvements that have been accomplished are truly remarkable. By means of a suction gas engine and nine-inch rotary pump river water is lifted 30 feet and then run along the face of a steep rocky precipice in a concrete flume. This artificial water-way is simply stuck to the wall of the mountain, its inner side being the native rock and its outer and bottom built of concrete.

* Marloth in "The Common Names of Plants" gives the spelling as "T'waa."—En.

Here the principal crop is lucerne, but I also saw wheat and some two-year-old oranges laden with fruit. Seven miles off along the river, but nineteen by the mountain road, lies the farm 'Abassa. Here also I saw lucerne lands under irrigation, and found citrus, figs and grape vines doing well. Mr. Kropohl, the owner, having been born in this part of the world, is quite conversant with the language and customs of the Hottentots and can interest one greatly. He explains that the names of nearly all the farms hereabouts have some relation to water, the most precious of fluids in this far western tract. Along the road to Pella I noticed many melk bosson (*Euphorbia* sp.), from which a latex is obtained; these bushes, when burnt, yield a valuable potash fertilizer. I understand that some companies have been formed to exploit them. On the way I also saw many of the valuable black Ebbehout trees (*Euclea pseudoebenus*), also kokerbomen, and, on the banks of the river, a great many bushes or trees called N'tsabi, probably a tamarisk; the leaves and young branches of this plant are used to clear the river water of mud as one uses alum for a like purpose. Along the banks of the river there are many native willow trees and here and there an occasional weeping willow, probably brought down from the high veld with flood water; all were infested with an extraordinarily large aphis,* and the incrustations of honey-dew formed by this creature were strikingly large and abundant, a fact no doubt to be attributed to the dryness of the climate causing the secretion to crystallize rapidly. Young Hottentot women were seen collecting the incrustation; subsequently they dissolve it in water and ferment an intoxicating drink, something like honeybeer.

Pella, a Roman Catholic Mission Station on the river, is about 800 ft. above sea level and 160 miles inland. Here are many date palms and grape vines, but the waters of the natural springs are rather brackish. Passing through the Game Reserve many springboks and a herd of twenty gemsbok were seen. At Kouwberg I was shown some fossil bones, probably those of a *dinosaurus* that had recovered at a depth between 80 to 120 feet in the sinking of a well.

One often has to use brackish water in Bushmanland. When outspanned at Galputs we made coffee with water obtained by digging holes in the sand fringing a saltpan. I allowed my cup to cool down, and then found the coffee had gained a most peculiar appearance; it appeared as a layer of clear water overlying a dark sediment. My Bastard driver said it was quite alright,

*Probably the common willow aphis *Lachnus viminalis*
Boyer. C.F.

and only wanted stirring to become coffee again. It certainly did resume a normal appearance, but was anything but pleasant to the taste.

Those who have read "The Lion Hunter," Gordon Cumming's account of "five years' adventures in the far interior of South Africa," a story that carries us back to 1843, will remember that in his tribute to the "fine dark eyes and fair forms of the nymphs of the Orange River" he speaks of the strings of beads these Griqua girls wear. *Inter alia*, he says: "One description of bead is peculiar to themselves and to the tribes extending along the Great Orange River to its junction with the sea; it is formed of the root of a bush found near the mouth of the Orange River, and possesses a sweet perfume." When at Steinkopf, the Rev. H. Kling gave me a string of beads possessing a peculiar perfume said to last for all time and to withstand immersion in water. These without doubt represented the beads referred to by Gordon Cumming, but it was explained to me that they were prepared by kneading together the leaves of the buchu bos, that grows only in the mountains of the Richtersveld, and a resin obtained from another bush in the same district. This resin drops from the bush and forms pellets in the sand, and it is from the sand that the natives recover it.

The Birds of Tsumeb and Ovamboland.

By Lt. C. C. FINCH DAVIES, M.B.O.U., First S.A.M.R.

In the course of a punitive expedition to the northern border of Ovamboland against the native chief Mandune, notes were made of the birds observed en route. These records, together with others made in Northern Damaraland, may, I hope, prove of general interest. The Expedition, as regards the First Regiment of South African Mounted Rifles, started from Tsumeb, the northern terminus of the railway in the South-West African Protectorate, on the 17th of January, 1917, and reached Namutoni, on the border of Ovamboland, three days later. I collected at Tsumeb for a couple of months; but, owing to the exigencies of

the Service, I was not able to do much during the expedition; however, I managed to get a few birds from time to time and observed many others.

Tsumeb is a small mining township lying among the low rocky kopjes of a range in which valuable copper deposits are found. The country hereabouts is all bush, covered with many large trees, and but little of the ubiquitous thorn tree so general in other parts. After leaving Tsumeb, the hills disappear, and then onward to the Portuguese border not a hill is to be seen, the whole country being almost flat. Between Tsumeb and Namutoni the bush extends, and here various species of acacia are found intermixed with mopane.*

Namutoni is the last police post to the north, where there is a well-built fort and good water from a permanent spring. The fort is situated on rising ground at the eastern end of the Great Etosha Pan. This pan is 70 miles long and 40 broad: during heavy rains it becomes a vast sheet of shallow brackish water; otherwise it is quite dry and glitters white with salt encrustation, producing wonderful mirages reflecting the patches of bush which project along its edges. This being the old German Game Reserve, it is a great resort of big game of various kinds. Lions are not uncommon. Wildebeest, gemsbuck, hartebeest, kudu and zebra are common, and were often to be seen feeding on the flats near the fort.

From Namutoni we went to Ondongwa, the capital of Ovamboland. I might mention here that the name Ondonga represents the whole district under the immediate rule of the paramount chief Martin. Ondongwa is the name of the head village, where the British Residency is situated. Between Namutoni and Ondongwa, the country is mostly bush covered, but there is one stretch of 50 miles on which there is none. On nearing Ondongwa the country becomes more open. Native kraals and grain lands are to be seen everywhere; here and there are small patches of bush and everywhere fine shady trees, mostly bearing fruit (marula and fig), and tall palms with fan-shaped leaves. During the summer months, from November to the end of March, there is, in normal seasons, a very heavy rainfall, and while we were there we scarcely had a day without rain. Consequently, owing to the flatness of the country, nearly the whole of Ovamboland becomes a marsh so that travelling with heavy transport is almost impossible. On the other hand, in the dry season the country

* Mopane (*Copaifera mopane*), a social tree of Northern Bechuanaland and Rhodesia. Also found north of the Zoutpansberg in the Transvaal.—ED.

is almost waterless. These huge marshes are a paradise for water birds of every description. Those men who were fortunate enough to have shot-guns were able to get good sport amongst the wild duck, which were a welcome addition to the pot. Leaving Ondongwa on the 2nd February, we reached Namakundi on the 4th, having a small skirmish with the natives en route. After leaving Ondongwa the country becomes much more thickly bushed and interspersed here and there with open marshes, the deeper pools being covered with blue water-lilies and, in the shallower parts, a pretty pink crinum. Namakunde itself is a small post on the Portuguese border consisting of a few large thatched houses built inside a stockade; this now forms the British Residency under a Sub-Commissioner, Major Fairlie. There is a moderately large population of friendly natives round Namakunde. On the 6th we went out and attacked the native chief Mandume; after a sharp fight we beat off the natives, and found that we had killed the chief. This finished the business, and when everything was settled we returned to Tsumeb, reaching there on the 11th March.

A few notes on the natives may be of interest. The Ovambos are a Bantu race, tall and well built, but rather slim, many having pleasing features, but very black in colour. The women have good figures, but neither they nor the men wear much in the way of clothing, a loose cloth and beads being considered sufficient; but the men are rapidly acquiring European clothing. The women have the hair dressed in a curious fashion, fibre and hair being mixed with grease and woven into the natural hair until it hangs down behind in long strings, almost to the ground. Besides trade beads, the women wear aprons consisting of long strings of little circular discs chipped from ostrich eggs or from the shells of freshwater molluscs. Some of the married women wear huge anklets of solid copper, each weighing 5 lbs. or more, rendering walking difficult. The men are nearly all armed with guns or rifles of some description; besides these they use bows and arrows, many of the latter poisoned, a long knife carried in a wooden scabbard, knob-kerries, and a stabbing assegai with an iron shaft ornamented half way with the tuft of a cow's tail. The native huts appear in most cases to have no walls, being small umbrella shaped grass constructions propped up on four poles. These are situated within a wooden stockade, the interior of which is a regular maze of passages; in a large kraal one can easily lose oneself. The main cultivated crop appears to be a kind of millet; a few mealies and pumpkins are also grown. The natives eat various wild fruits and bulbs, and make intoxicating drinks from palms and marula fruit. Their domestic animals comprise a few dogs of nondescript breeds, a few goats and very

small oxen; some of the chiefs have a few horses, but horses do not thrive well owing to horse-sickness. Malaria is very bad during the rainy season, and practically every man of the expedition suffered more or less from fever; we were lucky in losing only two men from this disease. All game, whether furred or feathered, seemed very scarce in Ovamboland, probably the natives hunt it too much.

I append a list of birds with field notes, following the nomenclature of the Transvaal Museum's "Check-list" by Dr. Gunning and Mr. A. K. Haagner:—

LIST OF SPECIES.

Struthio australis, Southern Ostrich. (Namutoni, nr. Etosha Pan.) Common. Although not met with in Ovamboland, it must occur as many natives wear ornaments of the feathers.

Hydrochelidon hybrida (Pall), Whiskered Tern. (Namutoni, Etosha Pan.) Single specimen seen.

Phalacrocorax africanus Gm., Reed Cormorant. (Nr. Nama-kunde). Numbers in marshes, perched on trees, standing in water or swimming and fishing in more open pools.

Pelecanus roscus Gm., Eastern White Pelican. (Namutoni.) Not observed. Adult shot by one of the men.

Nyroca capensis, South African Pochard. (Ovamboland.) Few seen in marshes.

Anas erythrорhyncha Gm., Red-billed Teal. (Ovamboland.) The common duck of Ovamboland and throughout Northern parts of S.W.A. Protectorate, in fair numbers on all marshes. I was surprised not to meet with the Yellow-bill, the common duck in the marshes of the Cape, Free State and Transvaal.

Dendrocygna viduata (Linn.), White-faced Duck. (Nr. Tsumeb and Namutoni.) Shot by Capt. Thompson, of Medical Corps.

Nettapus auritus (Bodd.), Dwarf Goose. (Ovamboland.) Few on all marshes, always in pairs.

Sarkidiornis melanotus (Penn.), Knob-billed Duck. (Ovamboland.) Next to the Red-billed Teal the commonest duck in Ovamboland. Usually in small parties of twos or threes; I once saw a flock of twenty-six. The enormous difference in size between the sexes is very noticeable when in flight. They were not wild, and formed a very welcome addition to our rations, as we found them excellent eating. They often perched in trees, and during the heat of the day it seemed to be their usual habit to sit in the branches of some thick foliaged tree which stood in the water; it looked strange to see large ducks in such situations. I did not hear the males voice any note, but the females uttered a croaking note when in flight.

Chenlopex aegyptiacus. Egyptian Goose. (Namakunde.) A friend at Namakunde informed me he had shot several.

Plectropterus gambensis, Spurwing Goose. (Ovamboland.) Apparently not common; the few seen were all white-faced birds. I still regard *Plectropterus niger* of Sclater as distinct.

Glareola melanoptera, Black-winged Pratincole. (Nr. Namutoni). Few small flocks during March.

Cursorius temmincki S.W., Lesser Courser. (Nr. Ondongwa.) Not uncommon on grassy flats. (Tsumeb.) Few seen.

Rhinoptilus chalcopterus, Bronze-wing Courser. (Nr. Tsumeb.) During December a few seen in bush. All were single birds.

Rhinoptilus africanus (Tem.), Two-banded Courser. (Nr. Ondongwa.) Secured specimen; several others seen at the same place. Remarkably tame, running about and catching insects within a few yards of the encampment where men and horses were moving about.

Charadrius asiaticus, Caspian Plover. (Tsumeb; Namutoni.) A flock was always to be seen on the open ground near our camp at Tsumeb. The males all appeared to be in breeding plumage and the females were in winter plumage.

Charadrius venustus, Red-banded Sandplover. (Etosha Pan; nr. Namutoni.) Rare; secured female. Saw one or two others. They were either single or in pairs, and in appearance and actions strongly reminiscent of the White-fronted Sandplover, so common on the Union coasts.

Charadrius tricollaris V., Three-banded Sandplover. (Nr. Namutoni and Ovamboland.) Apparently somewhat uncommon.

Stephanibyx coronatus, Crowned Lapwing. (Tsumeb; Namutoni; Ondongwa and Namakunde.) Rather common nr. Tsumeb, in flocks. Seems always to prefer the vicinity of human habitations. were never seen far away from kraals or outskirts of villages.

Hoplopterus speciosus, Blacksmith Plover. (Tsumeb; Namutoni; Ovamboland.) Not common at Tsumeb, only saw one small flock. Near Namutoni fort it was very common, and was seen throughout Ovamboland along edges of marshes. The birds were very tame, and would come flying towards one circling round and uttering their metallic clinking notes.

Lobivanellus lateralis, Large Wattled Plover. (From Namutoni to Namakunde.) In fair numbers in marshy ground.

Oedicnemus capensis, Cape Thick-knee. (Tsumeb; Ovamboland.) Few here and there.

Recurvirostra avocetta Linn., Avocet. (Nr. Namutoni.) Small flock seen on shallow pan. Rather wild. Secured male.

Himantopus himantopus Linn., Black-winged Stilt. (Namutoni.) Number seen, two secured. (Nr. Ondongwa.) A few noticed on marshes.

Totanus littoreus, Green Shank. Namutoni; Ovamboland.) Fairly common on all marshes.

Totanus pugnax (Linn.), Ruff. (Namutoni; Ovamboland.) Flocks on all marshes.

Totanus glareola, Wood Sandpiper. (Namutoni; Ovamboland.) Common on all marshes.

Tringa minuta (Leisl.), Little Stint. (Namutoni.) Small flocks seen.

Gallinago media, Double Snipe. (Nr. Namakunde.) Four specimens shot, others seen.

Rostratula bengalensis, Painted Snipe. (Nr. Namutoni.) A few seen.

Otis kori, Giant Bustard. (Tsumeb; Etosh Pan; Ovamboland.) Rather scarce round Tsumeb, but not uncommon at certain seasons in vicinity of Etosha Pan. A friend of mind told me he once saw twenty-six together. Only one or two seen in Ovamboland.

Otis cafra (Licht.), Stanley Bustard. (Namakunde; nr. Ondongwa.) A friend of mine shot a female near Namakunde, and on the return journey I shot a male, one of a pair, on some grassy flats near Ondongwa.

Otis ruficrista, Red-crested Bustard. (Tsumeb; Ovamboland.) A few seen here and there at Tsumeb and onwards through Ovamboland; seemed uncommon.

Otis afrooides A. Smith, White-quilled Bustard. (Etosha Pan; Ovamboland.) Common in vicinity of Namutoni and on open flats along the border of Etosha Pan, also in more open parts south of Ondongwa. Specimens shot near the latter place seemed very pale and greyish on the back; this may have been due to fading.

Anthropoides paradisea (Licht.), Blue Crane. (Nr. Etosha Pan.)

Balcarica regulorum (Benn.), Crowned Crane. (Etosha Pan.) Few only.

Gallinula angulata Sund., Lesser Moorhen. (Ovamboland.) Very common on all marshes. I was very surprised at the scarcity of crakes and rails of all sorts. I believe I saw *Crex egregia*, but am not sure. I expected to see *Jacanas*, as the marshes seemed perfectly suited to their habits.

Turnix lepurana, Kurrichane Button Quail. (Throughout.) Fairly common from Tsumeb northwards.

Pterocles variegatus, Spotted Sandgrouse. (South of Ondongwa.)

Few seen, specimen secured.

Pteroclurus mamaquus (Gm.). Namaqua Sandgrouse. (Nr. Namutoni.) Common during winter months and at all water holes along edge of Etosha Pan.

Ibis aethiopica (Lath.), Sacred Ibis. (Nr. Namakunde.) A flock seen.

Platalea alba, Spoonbill. (Namutoni.) Secured specimen out of small flock feeding in a shallow pan in company with some Wood Ibis, a greater and a lesser flamingo. Nr. Ondongwa: Several small flocks.

Tantalus ibis (L.) Wood Ibis. (Namutoni; Ovamboland.) Flocks seen at Namutoni and a fair number in Ovamboland; these were mostly young birds.

Anastomus lamelligerus. (Temm.) Openbill. (Ondongwa.) I first met with this strange bird a few miles south of Ondongwa, where I shot one of three seen. Afterwards saw a good many in shallow marshes either in small flocks or singly.

Abdimia abdimi (Licht.) White-bellied Stork. (Nr. Ondongwa.) Large flocks seen feeding in native cultivations and perched on surrounding trees.

Phoenicopterus roseus, Greater Flamingo. (Namutoni.) A large flock used to frequent the border of Etosha Pan near Namutoni fort. These were mostly adult birds. It was a wonderful sight to see them when they rose, like a pink cloud, and circled round, getting higher and higher till at last, when seen against a dark thundercloud, they resembled a pink veil being waved as they floated through the air.

Phoenicopterus minor, Lesser Flamingo. (Nr. Namutoni.) Noticed two or three single birds; these did not associate with the large flock of the greater flamingo.

Scopus umbretta Gm., Hammerhead. (Ovamboland.) Seemed to be scarce; only observed a few here and there.

Nycticorax nycticorax, Night Heron. (Ovamboland.) Large flocks on marshes, where they roosted on large shady trees standing in water.

Ardetta sturni, African Dwarf Bittern. (Ovamboland.) Seemed common in marshes; often flushed from trees and bushes standing in water. They were very nimble as they climbed about among the branches.

Erythrocnus rufiventris, Rufous-bellied Heron. (Nr. Namakunde.) An adult male secured. Several others seen in marshes.

Butorides atricapillus, Green-backed Heron. (Nr. Namakunde.) In marshes.

Melanophrys ardesiaca, Black Heron. (Ondongwa; Namakunde.)

Only saw two specimens of this rare heron; one near Ondongwa and one near Namakunde; the latter was associating with a flock of White Egrets, its black plumage was in great contrast to the snowy white of the egrets.

Ardea cinerea, Grey Heron. (Ovamboland.) Several seen in marshes.

Ardea melanoccephala, Black-headed Heron. (Ovamboland.) Several seen in same localities as Grey Heron.

Bubulcus ibis, Cattle Egret. (Nr. Ondongwa.) Small flocks noticed on one or two occasions.

Herodias garzetta, Little Egret. (Ovamboland.) Seen on several occasions mixed with the two following.

Herodias alba, Large White Egret. (Tsumeb; Ovamboland.) An adult female in full breeding plumage shot at Tsumeb, December. Subsequently several seen in Ovamboland, generally associating with the following species and the little Egret, when the difference in size could be easily noticed.

Herodias brachyrhyncha, Yellow-billed Egret. (Ovamboland.) The commonest Egret seen on all marshes. Very beautiful when perched on dark leaved trees, looking like snow white blossoms in the distance.

Vinago calva, Bald-fronted Green Pigeon. (Tsumeb.) Noticed once or twice. Ovamboland: A fair number amongst wild fruit trees.

Turtur senegalensis, Laughing Dove. (Throughout.) Very common.

Turtur capicola damarensis, Damara Turtledove. (Throughout.) Very common. Possibly the form found in Ovamboland may not belong to this sub-species; I collected no specimens.

Turtur ambiguus, White-bellied Turtle Dove. (Nr. Ondongwa.) A large dove which was not uncommon, I take to belong to this species; I brought back one specimen, an adult male; resembled *T. semitorquatus* in habits and general appearance, but the note is quite different.

Chalcolelia afra, Metallic-spotted Dove. (Tsumeb.) Very common. Those collected had some of the spots on the wing coverts almost purple.

Oena capensis, Namaqua Dove. (Throughout common.)

Numida papillosa, Damara Guinea Fowl. A few noticed all the way to Namakunde: not common.

Pternistes swainsoni, Swainson's Red-necked Francolin. (Throughout.) Fairly common in bush country where there are few natives.

Francolinus adspersus, Red-billed Francolin. (Between Tsumeb and South Ondongwa.) Fairly common.

Francolinus jugularis pallidior, Eriksson's Francolin. (Between Tsumeb Namutoni.) I am rather doubtful about the form of "Red Wing" found round Tsumeb and as far north as Namutoni, as specimens shot in these localities do not seem to agree with the description of the above sub-species. A fine male shot near Tsumeb is even more heavily marked on the lower surface than *F. gariepensis*, all the feathers having, not only a black edging, but also a dark brown spot or oval blotch on one or both webs. I have sent this specimen and an adult female to Mr. W. R. Ogilvie Grant of the British Museum for his opinion.* I did not notice this francolin after leaving Namutoni, and it is by no means common there nor at Tsumeb.

Francolinus sephaena, Crested Francolin. (Tsumeb to Odongwa.) Fairly common all through bush country, its ringing call being heard everywhere early in the morning and evening.

Lophogyps occipitalis, White-headed Vulture. (Ovamboland.) The only vulture seen; by no means common; seemed fairly tame. I saw one, which had been gorging on a dead horse, sitting on a branch beside the road and calmly surveying the whole column as we marched past.

Circus pygargus, Montague's Harrier. (Nr. Namutoni.) A number of these harriers seen beating over open country. Shot an adult and a young male. Believe I also saw *C. macrourus*, but am not sure.

Circus ranivorus, South African Marsh Harrier. (Nr. Namutoni.) Capt. Thompson, of the Medical Staff, informs me he shot a specimen, but I did not personally observe the species.

Melicrax canorus, Chanting Goshawk. (Between Tsumeb and Namutoni.) One or two specimens seen in thorn-bush country.

Melierax mechowi, Mechow's Goshawk. (Tsumeb.) Female shot; changing from young to adult plumage.

Micronisus gabar, Gabar Goshawk. (Throughout.) Seen here and there in bush country; not common. The black form (*M. niger*) appeared rare; I did not observe it, but Capt. Thompson shot a specimen near Tsumeb.

Hieraetus wahlbergi, Wahlberg's Eagle. (Nr. Tsumeb.) A pair nesting. Nest in a tall tree and inaccessible.

Aquila rapax, Tawny Eagle. (Throughout.) One or two seen; not common.

* I have since heard from O. Grant that this specimen is midway between *F. g. pallidior* and *F. g. jugularis*.

Buteo desertorum, Steppe Buzzard. (Nr. Ondongwa and Namukunde.) Several seen.

Helotarsus caudatus, Bateleur Eagle. (Throughout.) Mr. J. G. Millais in his beautiful book, "A Breath of the Veldt," describes this eagle as attacking game birds, and figures one "stooping" at a bush Korhaan. I have had a pretty good experience of this eagle, both in Pondoland and in S.W. Africa, but I have never seen it attack a living thing or observed it feeding on anything in the way of game. I once saw one carrying a dead snake; several times I have seen it feeding on carrion. While I was stationed at Okanjande several specimens were caught in traps set for Jackals and baited with raw meat. In my opinion it rarely attacks anything larger than a rat or lizard.

Milvus acgyptius, Yellow-billed Kite. (Tsumeb; Namutoni; Ovamboland.) Not common at Tsumeb; commoner at Namutoni; exceedingly plentiful at Ovamboland. At all our camps numbers were to be seen wheeling overhead or perched on the surrounding trees. They were remarkably fearless, and were continually swooping down amongst the camp fires and cooking pots, regardless of the men, and picking up scraps of meat and refuse. They were breeding in numbers in the larger trees. I did not observe the Black Kite.

Elanus caeruleus, Black-shouldered Kite. (Nr. Tsumeb.) Rare; one or two seen.

Falco biarmicus, South African Lanner. (Throughout.) One or two seen on various occasions. I also thought I saw *Falco minor* near Namutoni, but could not identify it with certainty.

Cerchneis rupicoloidea, Large African Kestrel. (Between Tsumeb and Namutoni.) Few seen.

Cerchneis rupicola, S. African Kestrel. (Tsumeb.) Not uncommon where there are hills.

Cerchneis naumannni, Lesser Kestrel. (Nr. Tsumeb.) Large numbers seen about middle of March; all travelling in a northerly direction.

Cerchneis amurensis, Eastern Red-footed Kestrel. (Tsumeb.) Few seen.

Bubo maculosus, Spotted Eagle Owl. (Tsumeb.) Specimen shot.

Strix fiammea maculata, Cape Barn Owl. (Tsumeb; Ovamboland.) I often heard the note of this species at night.

Poicephalus meyeri, Meyers Parrot. (Namakunde and Ondongwa.) Common; feeding in small flocks on marulus and other wild fruits. Not observed at Tsumeb, but Capt. Thompson tells me he found it common there in February and March. The form in this country appears to be *P. meyeri damarensis*,

wanting yellow band on forehead present in typical form. On one or two occasions near Namakunde I saw another large parrot, probably *Poicephalus robustus suahelicus*.

Agapornis roseicollis, Rosy-faced Lovebird. (Namakunde.) Nesting amongst fronds of tall palms near Residency.

Chizaerhis concolor, Grey Lourie. (Throughout.) Very common.

Clamator jacobinus, Black and White Cuckoo. (Tsumeb; Ondongwa.) Several seen.

Clamator glandarius, Great-spotted Cuckoo. (Tsumeb.) Seen on several occasions. Ondongwa and Namakunde: Very common.

Tricholaema leucomelan, Pied Barbet. (Throughout.) Very common.

Barbatula extoni, Yellow-fronted Tinker Barber. (Tsumeb.) Specimen shot. Often heard its note in Ovamboland.

Dendromus bennetti, Bennetts Woodpecker. (Ovamboland.) Several seen: secured an adult male.

Dendropicos guineensis, Cardinal Woodpecker. (Tsumeb.) Not uncommon.

Colius colius damarensis, Damara Coly. (Ondongwa.) Small flocks seen.

Coracias garrulus, European Roller. Tsumeb: Several seen; while marching northward, large numbers passed over, travelling northwards and evidently migrating.

Coracias caudatus, Lilac-breasted Roller. (Ovamboland.) Common.

Coracias mosambicus, White-naped Roller. (Tsumeb.) Not uncommon between there and Namutoni.

Bucorvus cafer, Ground Hornbill. (Ovamboland.) Not uncommon. Feeding in native cultivations.

Lophoceros nasutus cpirhinus, South African Grey Hornbill. (Throughout.) Fairly common.

Lophoceros erythrorhynchus, Red-billed Horn-bill. (Tsumeb; Ovamboland.) Throughout bush country.

Halcyon chelicuti, Striped Kingfisher. (Tsumeb.) Only one specimen met with: this I secured. (Namakunde and Ondongwa.) Several seen.

Halcyon cyanoleucus, Angola Kingfisher. (Ondongwa.) Common round our camp, where its cheerful and rather musical note was heard all day long. The birds looked very beautiful as they greeted one another on some bare branch, with wings and tail outspread.

Melittophagus meridionalis, Little Bee-eater. (Namakunde.) A few frequent trees near Residency.

Dicrurus hirundineus, Swallow-tailed Bee-eater. (Throughout.) Common. Apparently the common bee-eater all through bush covered parts of S.W. African Protectorate.

Merops apiaster, European Bee-eater. (Namutoni.) One flock seen.

Merops persicus, Blue-cheeked Bee-eater. (Ondongwa.) Secured male from a flock. In note and flight it exactly resembles *M. apiaster*.

Upupa africana, African Hoopoe. (Throughout.) Common.

Irrisor erythrorhynchos damarensis, Damara Wood Hoopoe. (Tsumeb.) Secured examples; not common.

Rhinopomastus cyanomelas, Scimitar-billed Wood Hoopoe. (Throughout.) Common.

Caprimulgus rufigena, Rufous-cheeked Nightjar. (Tsumeb.) A female shot.

Caprimulgus fossi, Mozambique Nightjar. (Ondongwa.) Female secured. Nightjars were often seen, and heard nightly, but I had no opportunity of collecting them. I thought I heard the note of the Natal Nightjar on several occasions.

Apus barbatus, Black Swift. (Throughout.) Black swifts which I believe belonged to this species were often seen.

Tachornis parvus brachypterus, Palm Swift. (Ovamboland.) Common wherever tall palms were found.

Riparia cincta, Banded Sandmartin. (Between Namutoni and Ondongwa.) Few seen in open country.

Riparia fuligula anderssoni, Damara Rock Martin. (Tsumeb.) Common.

Hirundo rustica, European Swallow. (Throughout.) Not very common.

Hirundo cucullata, Larger Stripe-breasted Swallow. (Tsumeb.) Common.

Hirundo semirufa, Red-breasted Swallow. (Tsumeb; Ovamboland.) Pair secured. A few others seen here and there.

Bradornis mariquensis, Mariqua Flycatcher. (Throughout.) Very common.

Batis pririt, Pririt Flycatcher. (Throughout.) Fairly common.

Tchitrea plumbeiceps, Lead-headed Flycatcher. (Tsumeb.) Exceedingly common. (Ovamboland.) Seen on several occasions in thicker bush.

Campephaga nigrat, Black Cuckoo-Shrike. (Tsumeb.) Pair shot; only occasion when seen.

Eurocephalus anguitimens, Smiths Wood Shrike. (Tsumeb.) Common. (Ovamboland.) Seen on several occasions in thick bush.

Prionops talacoma, S. African Helmet Shrike. (Tsumeb.) Common. (Ovamboland.) Seen throughout in bush country.

Nilaus brubru, Brubru Bushshrike. (Tsumeb.) Not common. (Ovamboland.) Heard its call note on several occasions.

Pomatorhynchus australis, Three-streaked Bush-shrike. (Throughout.) Fairly common amongst thorn bush.

Pomatorhynchus senegalus, Black-crowned Bush Shrike. (Tsumeb.) Shot specimen; often heard its call.

Lanarius atroccineus, Crimson-breasted Shrike. (Tsumeb.) Rather scarce. (Ovamboland, nr. Ondongwa.) Becomes common as soon as the tracts of thorn bush are reached.

Dryoscopus cubla, Lesser Puff-back Shrike. (Tsumeb; Ondongwa; Namakunde; Ovamboland.) Not uncommon amongst thick bush near Tsumeb; several seen near Ondongwa, Namakunde, and in Ovamboland. I think the form found in this country must be *D. cubla hamatus*. It appears to differ somewhat in plumage from the typical form, especially in the female. The note also is very different. (See Sclater's Check List, page 380.)

Lanius minor, Lesser Grey Shrike. (Tsumeb.) A few seen.

Lanius collurio, Red-backed Shrike. (Tsumeb.) A few seen.

Urolestes melanoleucus, Long-tailed Bush Shrike. (Nr. Tsumeb.) A few seen.

Corvus scapulatus, Pied Crow. (Namutoni.) Fairly common. (Ovamboland.) In Ovamboland it was exceedingly common, and haunted our camps in large numbers in company with kites. For the first time in my experience I saw this species in flocks; every afternoon for some reason they used to collect together to the number of a hundred or more and circle round overhead, cawing loudly, and after a while settle down again.

Heterocorax capensis, African Rook. (Tsumeb; Ovamboland.) Seen here and there, uncommon.

Dicrurus afer, Fork-tailed Drongo. (Throughout.) Common where there are trees.

Oriolus oriolus, Golden Oriole. *Oriolus notatus*, Andersson's Oriole. (Tsumeb; Ovamboland.) I shot two immature specimens of Andersson's Oriole at Tsumeb. Both here, and on several occasions in Ovamboland, I saw Orioles, both adults and young, but could not be sure to which of the above species they belonged.

Creatophora carunculatus, Wattled Starling. (Tsumeb; Ovamboland.) Observed on several occasions.

Cinnyricinclus verreauxi, Plum-coloured Starling. (Tsumeb.) Very common in December and up to the time of departure in January. Males and females in about equal numbers.

Lamprocolius phoenicopterus bispectularis, Lesser Red-shouldered Glossy Starling. (Throughout.) Very common. Specimens shot at Tsumeb seemed rather larger than those collected further south.

Amydrus caffer, Pale-winged Starling. (Tsumeb.) A few seen.

Lamprotornis australis, Larchell's Glossy Starling. (From Ondougwā northwards.) Very common in all bush country.

Textor niger, Buffalo Weaver. (Tsumeb.) Scarce. (Ovamboland.) Not uncommon amongst bush.

Plocepasser mahali, White-browed Weaver Bird. (Throughout.) Common.

Sporopipes squamifrons, Scaly-feathered Weaver. (Throughout.) Common.

Ploceus cabanisi, Cabanis Weaver. (Throughout.) Common. Only yellow weaver observed.

Quelea sanguinirostris tathami, Southern Pink-billed Weaver. (Tsumeb.) Common. (Ovamboland.) Seen.

Pyromelana taha, Golden Bishop Bird. (Ovamboland.) Common and breeding in all marshes.

Pyromelana orix, Red Bishop Bird. (Ovamboland.) Common amongst native grain fields. The nests noticed instead of being built in reeds, as usual, were built in clumps of low palms, each nest being built on two or three spikes of the fan shaped leaves and constructed of some dark brown fibre.

Amadina erythrocephala, Red-headed Weaver Finch. (Throughout.) Fairly common.

Pytilia melba, Melba Finch. (Tsumeb; Ovamboland.) In small numbers.

Estrilda angolensis, Blue-breasted Waxbill. (Ovamboland.) Throughout in fair numbers.

Estrilda erythronota, Black-cheeked Waxbill. (Throughout.) In small numbers.

Uraeginthus granatinus, Violet-eared Waxbill. (Throughout.) Not very common.

Tetraenura regia, Shaft-tailed Widow Bird. (Throughout.) Not very common.

Steganura paradisea, Paradise Widowbird. (Throughout.) A few here and there in country traversed.

Passer griseus, Grey-headed Sparrow. (Throughout.) Fairly common.

Poiospiza angolensis, Black-throated Seed-eater. (Throughout.) Very common.

Emberiza flaviventris, Golden-breasted Bunting. (Tsumeb.) exceedingly common. (Ovamboland.) In fair numbers all through.

Motacilla capensis, Cape Wagtail. (Tsumeb.) Common.

Anthus leucophrys, Plain-backed Pipit. (Throughout.) Not uncommon. Possibly I also saw the tawny Pipit.

Mirafra nacria, Dark-lined Lark. (Tsumeb.) In fair numbers. Specimens shot seem rather grey in colour as compared with specimens from further south.

Mirafra africanaoides, Fawn-coloured Lark. (Tsumeb.) Not common. Not seen further north than Namutoni.

Mirafra africana, Rufous-naped Lark. (Tsumeb.) Not common. Besides the above species of *Mirafra* I collected a large very pale coloured lark near Ondongwa, which I have been unable to identify so far. I also saw several of the "Clapper" larks, but did not collect.

Pinarocorys nigricans, Dusky Lark. (Tsumeb.) Rare.

Pyrrhulauda sp? Finch-larks of some species were common on open flats near Etosha Pan, but I secured no specimens for identification.

Calandrella conirostris, Pink-billed Lark. (S. of Ondongwa.) On some open grass country. Specimens secured.

Calandrella cinerea, Red-capped Lark. (Namutoni; Tsumeb.) Common on open ground round camp and village at Tsumeb.

Pycnonotus capensis nigricans, Red-eyed Bulbul. (Throughout.) Common.

Chalcomitra gutturalis, Scarlet-breasted Sunbird. (Tsumeb.) Common. Southern Ondongwa: Seen. At Namakunde I saw a black Sunbird which I took to be *C. kirki*.

Chalcomitra fusca, White-vented Sunbird. (Between Namutoni and Ondongwa.) Not uncommon in the sandveld.

Cinnyris leucogaster, White-breasted Sunbird. (Tsumeb.) Common.

Cinnyris mariquensis, Southern bifasciated Sunbird. (Nr. Ondongwa.) Uncommon.

Parus niger, Black Tit. (Tsumeb; Ovamboland.) Common throughout.

Parisoma subcaeruleum, Tit-babbler. (Throughout.) Fairly common in thorn bush country.

Cisticola rufulata, Rufous Grass Warbler. (Nr. Tsumeb.) Common amongst scrub-bush. Grass Warblers of several species were observed in Ovamboland, none collected.

Calamonastes fasciolatus, Barred Wren Warbler. (Throughout.) Common in thorn bush country, where its monotonous metallic call can be heard at all times.

Acrocephalus baeticatus, African Reed-Warbler. (Ovamboland.) Seen and heard in marshes.

Prinia flavicans, Black-chested Wren Warbler. (Throughout.) Common.

Camaroptera griescoviridis sundevalli, Grey-backed Bush Warbler. (Nr. Tsumeb.) Amongst thick bush.

Sylvietta rufescens, Crombec. Throughout thorn bush country; common.

(The Damaraland form has been separated under the name of *S. r. ochroarea* by Oberholser of the U.S. Nat. Museum.—Ed.)

Phylloscopus trochilus, Willow Wren. (Tsumeb; nr. Ondongwa.)

Crateroporus melanops, Black-faced Babbler. (Between Tsumeb and Namutoni.) Specimens secured by Capt. Thompson from a flock.

Crateroporus bicolor, Pied Babbler. (Tsumeb.) Decidedly rare, seen only once.

Aethocichla gymnogenys, Bare-cheeked Babbler. (Otavifontein; Tsumeb.) This species is new to the S. African avifauna. I first met with it at Otavifontein and later collected several specimens at Tsumeb, and sent two males to Dr. Peringuey, of the S.A. Museum, who kindly identified them for me. The species was originally described by Hartlaub from Angola. I will give here a rough description. Upper surface, wings and tail, dark brown, feathers edged with lighter and more rufous; rump white. Head and undersurface, buffy whitish—the feathers on top of head and breast with brownish bases. Back of neck tawny rufous. A patch of bare black skin surrounds the eyes and ear-holes. Bill and feet black, irides yellow. In habits this species resembles the pied babbler and its notes are very similar. It goes about in flocks of six to eight or more in number, feeding often on the ground, and now and then congregating together and uttering a weird chuckling chorus.

Chaetops pycnopygius, Damara Rock Jumper. (Nr. Tsumeb.) A few amongst rocky kopjes. Possesses a rather pretty, but short song. The plumage is peculiarly dense and fluffy.

Geocichla litsipsirupa. Groundscraper Thrush. (Throughout.) Fairly common.

Monticola brevipes, Short-toed Rock Thrush. (Tsumeb.) Common.

Myrmecocichla formicivora, Ant-eating Chat. (Nr. Tsumeb.) Common. (S. Ondongwa.) Seen on several occasions.

Saxicola pileata, Capped Wheat-ear. (Tsumeb.) A few used to frequent the outskirts of the camp: none collected. It struck me that the black breast-band was remarkably indistinct.

Erythropygia munda, Damara Ground Robin. (Throughout.) Common in all thorn bush country.

Erythropygia paena, Smith's Ground Robin. (S. Ondongwa.) Not uncommon in scrub of more open sandy parts.

Phoenicurus familiaris, Familiar Chat. (Nr. Tsumeb.) Common.

Natural Enemy of the Argentine Ant.

By C. N. KNOX-DAVIS, Johannesburg.

In the house occupied by me there lived a number of colonies of the Argentine Ant, often called sugar ant, which became a pest in the pantry and wherever food was kept. These I managed to eradicate by using arsenite of soda with a sweet bait and by placing a pinch of corrosive sublimate at the entrances to the nests. Sometime after I noticed a colony of red ants close to the house.* These are the ants that tackle a bone left lying on the grass. They appear to avoid daylight and approach their food from under the ground. Of course there were innumerable colonies of Argentine Ants still in the grounds in which the house stands, and these used to take advantage of the moisture and warmth in the tins in which my plants grow, to rear their larvae and pupae. On one occasion I noticed under one of the tins a large number of dead ants, but nothing to show how they had been killed. Shortly after I saw a red ant being tackled by the Argentine Ants, one holding on to each leg and antenna, so that only movement of the abdomen was possible. Every now and again an Argentine Ant would, apparently casually, separate out from the beaten track and walk over the body of the prisoner. This lasted for half an hour, and then I drove off the captors, but the prisoner was done for. It only writhed for a few minutes.

The next day I located a colony of Argentine Ants under a paraffin tin, but took no notice of them. The following day there was a tremendous stream of them coming out of the top of the soil in the tin, and great excitement prevailed. They were carrying off their larvae and pupae to a hole some feet away. It was an exodus. On lifting the tin the mystery was solved, for there were the red ants, soldiers, workers and intermediate grades bustling about as busily below as the Argentines were above. That gave me a new idea. Now, when I find a colony of sugar ants in a tin I find a tin under which the red ants are working, and change the two tins about, with the result that the nest is soon shifted. I cannot definitely say that the red ants destroy the black, for I have not seen them do so, but the effect is there.

*Probably *Dorylus helvolus*.—ED.

As regards the red ant, he is evidently a meat eater, and fierce accordingly. On one occasion I saw one of the inter-times got one of his jumping legs under the ant, and kicked it immediate size tackle a small disabled cricket. The cricket several about 2 inches away, but the ant returned to the attack without hesitation, making for the neck. At last it got to that spot and the cricket died very quickly. This ant will pierce and clean out the chrysalids of vine and willow hawk moths. As before noted, it avoids sunlight, for it makes its way from tin to tin by underground passages. Two vine hawk moth chrysalids I had under a glass in a tin of soil were cleaned out from underneath, and my attention to them was only attracted by seeing that the earth had been disturbed about them.

The Argentine Ant has not been driven from its haunts, but evidently it fears and avoids this enemy which approaches it so insidiously.

On a piece of ground in Observatory, which I have started to break up, are a large number of nests of *Cubitermes*. One large nest came up in big pieces, which I broke up with a pick and left lying. Next morning I moved the surface of the pieces with my foot, and found the whole mass underneath swarming with the red ants above described, evidently after the termites, which had all disappeared.

Nearby the native put his pick into a small nest of *Cubitermes*, and within a few seconds he called me and showed me what was taking place. The ants had rushed in in thousands and were carrying off the larvae as fast as possible. The adult termites were left alone with a few exceptions, the red ants when they tackled them made for the neck in every instance. In this raid I only noticed small red workers.

NOTES ON WHITE ANTS.

By CLAUDE FULLER.

II. TERMITES AS FOOD AND SOME ILL-EFFECTS.

How far back the records may go to show that termites have been used as food, by the aborigines of those countries in which these insects abound, only researches impossible to undertake in South Africa can show. However, more than one hundred years ago comments upon this habit began to appear in scientific literature. One of the oldest of the observations recorded is that of Sparmann, who collected termites in South Africa, and in his travelys reached Bruintjeshoogte, near Somerset East. The notes of this naturalist were published in 1778 by Baron de Geer, who credits Sparmann with saying "the Hottentots eat these insects, and even grow fat upon them." A year later Koenig stated that in the East Indies the natives so used the flying insects. He says in effect "they catch great quantities of which they make with flour a kind of pastry. This food is very plentiful; the great use of it brings on an epidemic. colic and dysentery, which kills in two or three hours." Koenig also adds the information that: "In some parts of the East Indies the queens are given alive to strengthen the back." There are also records of the existence of the habit in South America, and in 1781 Smeathman described how the natives of Equatorial Africa collected the flying termites and prepared them as food. He says, *inter alia*: "They collect the flying insects and parch them in iron pots over a gentle fire, stirring them about as is usually done in roasting coffee. In that state, without sauce or any other addition, they serve them as a delicious food, and they put them in handfuls into their mouths as we do comfits. I have eaten them dressed in this way several times, and think them both delicate, nourishing and wholesome."

Broadly speaking, the natives of South Africa as a whole do not eat flying termites. Common as the practice seems to be in Central Africa, it does not appear to extend further south than

the Zoutpansberg district, and is there confined to the natives living in the Low Veld.

It is true that among the Zulus flying termites, more especially *Termes natalensis*, are caught haphazardly and eaten; but this is only done by the young people, and is more a part of the amusement of youth than anything else. In times of famine things may be different. Thus, for example, I am informed that during the famine which obtained in the Transvaal at the time of the Matabele war, when locusts had destroyed their crops, the Bequanas and Bekathlas of the "Bushveld" were reduced to searching for undigested grains in the droppings of horses and oxen along the high roads and to the eating of insects, especially the larvae of *Nudaurelia tyrrhea* and winged true ants, catching the last mentioned in baskets inverted over the nests as the ants came forth for the nuptial flight.

The remarks made by Sparrman to De Geer regarding the practice of the Hottentots have a different bearing. Sparrman was possibly speaking from hearsay, or at best he did not elaborate what he knew or had been told. The Hottentots do not eat flying termites, but collect termites when in the last stage of nymphal development, and then only the nymphs of *Hodotermes*, particularly those of *H. viator* (Latreille).

Although various kinds of *Hodotermes* or Harvesting termites are to be met with from the Cape to the Limpopo and further, throughout the greater part of the Union it is a very laborious matter to dig out their nests. In many parts it is a physical impossibility, as they lie deep amongst rocks in hard soil or in the interstices of limestone formations. Moreover, upon the surface of the soil, there is no regular indication, such as a mound, to indicate the exact site of a nest. It is not surprising, therefore, that the custom is only found among the Hottentots and Bastards of Namaqualand, Bushmanland and the Western Cape, where the soil is sandy and readily dug. In those parts the nests are not only traceable, but they can be easily exposed, and large quantities of the insects obtained from them. How the nests are found is told in a letter, written to me by my colleague, Mr. F. Thomsen, from Steinkopf. Here I may say that when it was proposed that this officer should go to Namaqualand, I drew his attention to Professor F. Silvestri's casual record of the finding of the queen of *Hodotermes viator* by Dr. Leonard Schultze: a thing we had never been able to do in the *Hodotermes* infested soil of Pretoria. And I asked him to find out if the nests were easily located and dug there and if possible to obtain some queens for me. Mr. Thomsen says:

"On the Sunday morning, the day after my arrival here, I was taking a walk around the village, when I had the good fortune to come upon some Hottentots and Bastards digging out *Hodotermes* nests. It was with no little pleasure that I watched them at their operations. First of all, they locate spots where the termites are busy at work dragging in particles of vegetation, and, selecting several openings which appear to be most in use at the moment, they insert a piece of straw well into each gangway, and open these up for two or perhaps three feet. Then they listen. This they do with a piece of Spanish reed or bamboo about 12 inches long; this instrument they call their "telephone." The tube is placed over one of the orifices and fastened lightly in place with some soil. They then place their ear against the upper end and listen. On following their example I found that a sound as of insects crawling and scratching could be heard. They try one after another of the several gangways, and then select that from which the loudest noise comes. By the aid of a straw on this tube they follow the course of the gangway, digging away the sand rapidly and easily. In this way the nest is soon reached, although it may lie a depth of from 4 to 6 feet. In conversing with these people I learned that they were quite familiar with the queens, and they told me that these were active and moved quickly and, as a rule, had left the nest before it was reached by the diggers. As I could not find a queen in the exposed nests, I became rather doubtful, more especially as they assured me that two or three were always present. I, therefore, offered them a shilling apiece for each queen, and they at length secured three for me, after laying bare three nests. I noticed that as soon as the top of the nest cavity had been exposed they dug rapidly around the sides to intercept the queens, and found these moving about at the bottom."

In another letter Mr. Thomsen speaks of how the natives collect and prepare *Hodotermes* for eating. He says:—

"The natives dig out the nest and put all the contents into a bag and so carry them home. Arrived here they empty the bag over a bucket full of water. All the earth particles, the soldiers and the workers sink to the bottom, whilst the nymphs float. These are skimmed off by hand, pieces of vegetation from the nest which accompany them are cleaned off more or less casually, and they are then fried, with or without fat, in a pan. When at Van Rhynsdorp I was told that cases of death had followed the eating of these termites, and I came to the conclusion that, if such were the case, it must have been due to an orgie following a period of starvation. I was also told that termites

were much favoured among these people for the rejuvenating effect such nourishment had on those who regarded themselves as impotent."

In connection with the above, the accompanying extracts from the Journal of the Cape Entomologist, bearing upon the deaths of two natives following a *Hodotermes* feast are not without interest:—

Journl V., p. 126. F. Migel, coloured, age 45, died 29th June, 1906, at Zandkraal, Van Rynsdorp. Deceased obtained termites from the veld on the 28th and his family of four, including a child of seven years, none of whom had partaken of food upon that day, made a meal of these after roasting them in a cooking pot. All got ill after the meal complaining of dizziness, distension, a dismal feeling, shaking and trembling. Deceased commenced vomiting in the night and died before dawn.

The reports of the Resident Magistrate contain the following comments: "Death was evidently brought about by eating 'rijstmieren' out of season and improperly prepared. It is only the large white forms that are eaten, those with a reddish tinge (soldiers and workers) are thrown out before the final preparation. The practice of eating these white ants is very common in the district and is not confined to natives only. The proper season of the year is towards the end of winter, after the rains, say, during the months of June, July and August, before the insects arrive at the flying stage. It will be found that these insects are eaten in many other parts of Cape Colony. Up to the present I have not heard of any other cases of severe illness following a meal of this kind but it is said that if eaten alone the effect is very severe, especially on the first occasion. The preparation is simple but it is necessary to know what to throw aside as there is often some foreign body or matter which is said to be poisonous. The insects are thrown into a pot of boiling water and stirred around so as to cleanse them; the reddish forms are then picked out and those that are edible baked in a pan. Those persons that have bread then spread the baked insects on this and eat it as a savoury."

The Revd. L. A. R. du Plessis, Ebenezer, states: "Rijstmieren" are esteemed a rather dainty dish. The practice of eating them is common. April, June and again August and September are the months they are dug out and eaten. The only insect found among them is a kind of 'alkant,' this is generally thrown away but is not considered poisonous."

The Field Cornet reports: "The insects were prepared in a cooking pot as usual and the report that they had been cooked in a sheep dip pot was found to be without foundation. The

practice of eating them is common, especially in times of distress. Old people say they are fit to eat as soon as winter begins. Others that are acquainted with them tell me that the insects produce much oil when roasted and if eaten without bread, etc., they act as a strong purgative. The deceased said he was on the point of starvation and that in his opinion 'his stomach could not stand the nutrition of pure ants.'

In September of the same year a further death occurred in the district of van Rynsdorp following a meal of rijstmieren. This was investigated by the District Surgeon. The memorandum prepared by this official states: "Four adults and deceased, a child of three years, ate of the insects at 4 p.m., 26th Sept. at Heerenlogement. The insects had been cooked in a pot. Within an hour all felt giddiness, with numbness in arms and legs. Adults also vomited. No pains in stomach nor purging. Deceased seems to have slept until 3 a.m. of the 27th September and then had a slight convulsion and died. The adults, except a woman of 50 years with whom vomiting continued until the afternoon of 27th September, speedily recovered after vomiting. A quantity of cooked rijstmieren were secured for further examination."

The insects to which reference is made in the memorandum of the District Surgeon, after a period of fifteen years, now lie before me. The collection comprises nearly adult nymphs with large wing pads, winged imagoes and soldiers, and all appear to have been par-boiled, none show any evidence of roasting. The species is without doubt *Hodotermes viator* (Latr.).

In reviewing the foregoing it is interesting to notice that in both the East Indies and South Africa the queen termites are regarded by the natives as possessing certain medicinal virtues and that in both countries over indulgence is said to lead to distress and possibly death. There is a general consensus of opinion, among those who are familiar with the Hottentots, that these people regard a certain insect associated with *Hodotermes* as being poisonous. That, however, I am informed on very good authority, is not altogether remarkable as these people look upon most insects as being poisonous. I have endeavoured to ascertain what creature it is that is referred to as the "Alkant." The word means "on both sides" and the insect has been described to me as one which appears to have a head at each end of its body and to have the power of progressing backwards and forwards with equal facility, as the word implies. With the object of obtaining some more precise data on the matter, the Rev. H. Kling of Steinkopf had a nest of *Hodotermes viator* dug out under his personal supervision.

That the nest exposed was quite normal is exemplified by the fact that two queens were secured as well as representatives of the three other adult castes. With these specimens Mr. Kling sent me four beetles (*Trichoplus vicinus*) which he states he took out of the nest himself. These he tells me the Hottentots call "Amib Kha-Khoib," the poisonous termite, or "Alkant" in the Van Rhynsdorp district, and cites it as the creature that is especially sought for and removed.

Later on Mr. Kling sent me six more of these beetles with the information that they were taken from another *Hodotermes* nest.

It seems questionable, however, whether there is any particular insect associated with *Hodotermes* that renders the nymphs poisonous. The Cetonid under reference has hitherto been regarded as myrmecophilus, although Dr. L. Schultze, in 1907, recorded the finding of *Trichoplus aepyptus* Kolbe in the nests of *H. viator*.

REVIEWS

"NEW SOUTH AFRICAN LEPIDOPTERA," by Sir George F. Hampson, Bart.

- (1) *Novitates Zoologicae*, Vol. XXV., pp. 93-217, May, 1918, contains a supplement to the AMATIDÆ, LITHOSIDÆ, and NOCTUIDÆ. Sixteen new species are described. Several new genera are characterized, some of which occur in South Africa. The family name AGARISTIDÆ is now changed into PHALÆNOUDIDÆ; the sub-family *Acontianac* into *Vestermannianae*.
- (2) *Ann. and Mag. Nat. Hist.*, Ser. 9, Vol. I., March-Sept., 1918, contains descriptions of three species new to South Africa belonging to the family PYRAUSTINÆ.
- (3) *Proc. Zool. Soc. Lond.*, Aug., 1918, pp. 55-131, contains a valuable paper on the classification of the HYPSTROPINÆ (formerly known as ANARISTIANÆ) in which the classification is revised and several new genera and species are described. Eighteen of the species are new for S. Africa. To the present Ragonot's work in Romanoff's *Memoirs*, Vol. VIII, was the only work dealing thoroughly with this sub-

family. Most of it was done by Sir George Hampson in editing the volume after Ragonot's death and as the work is exceedingly rare the new revision is doubly welcome. All genera are re-described and generic keys and full lists of synonyms are added.

It may be of interest to draw attention to the following footnote found in this paper: "No quotations from German authors published since 1st August, 1914, are inserted '*Hostes humani generis*'".

I am given to understand that many workers in England are determined to exclude all species described in German and any other language of the Central Empires since the date mentioned.

In a review of this proposal Lord Walsingham, *Nature*, 5th Sept., 1918, argues very strongly in favour of the adoption of such a scheme. I do not intend to discuss this matter from a political point of view, as that is quite out of my province, but I certainly feel it my duty to point out that, unless this practice is sanctioned and generally adopted by an International Zoological Congress, considerable difficulties will arise out of it at some future time. As it is, much valuable time has to be given by taxonomists to the cataloguing and study of synonyms. This is an uninteresting and often an unprofitable task and, should the proposal now put forward be adopted and subsequently abandoned, it is clear that the number of synonyms, already immense, will be more than doubled. Therefore, I think it advisable that as many Scientific Societies as possible should take an interest in this movement and that an International Zoological Congress should be arranged to settle the matter now and for the future.

A. J. T. J.

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